

PERRY COUNTY DRAINAGE AND LEVEE DISTRICTS
NOS. 1, 2, AND 3, MISSOURI

LETTER
FROM
THE SECRETARY OF THE ARMY
TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY, DATED MAY 11, 1972, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND AN ILLUSTRATION, ON PERRY COUNTY DRAINAGE AND LEVEE DISTRICTS NOS. 1, 2, AND 3, MISSOURI, AUTHORIZED BY THE FLOOD CONTROL ACT APPROVED JULY 24, 1946.



SEPTEMBER 25, 1972.—Referred to the Committee on Public Works and ordered to be printed with an illustration

PLATT COUNTY DRAINAGE AND LEVEE DISTRICT
NO. 1 AND 2, MISSOURI

1871

1872

THE SECRETARY OF THE ALMA

OF THE DISTRICT

A FURTHER PROCEEDING OF THE DISTRICT OF
PLATT COUNTY, MISSOURI, IN THE MATTER OF
A REPORT MADE BY THE DISTRICT ENGINEER
AND COMMISSIONER OF PLATT COUNTY, MISSOURI,
AND THE DISTRICT OF PLATT COUNTY, MISSOURI,
AND THE DISTRICT OF PLATT COUNTY, MISSOURI,
AND THE DISTRICT OF PLATT COUNTY, MISSOURI,

1873

BEFORE THE DISTRICT OF PLATT COUNTY, MISSOURI, IN THE MATTER OF
A REPORT MADE BY THE DISTRICT ENGINEER

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THESE ARE THE RESULTS OF THE
RESEARCH IN THE FIELD OF THE
HUMAN MIND

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LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310



September 14, 1972

Honorable Carl Albert
Speaker of the House of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

I am transmitting herewith a favorable report dated 11 May 1972, from the Chief of Engineers, Department of the Army, together with accompanying papers and an illustration, on Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, authorized by the Flood Control Act approved 24 July 1946.

The views of the Governor of Missouri, the State of Illinois, the Departments of the Interior, Agriculture, Transportation, Health, Education, and Welfare, and the Environmental Protection Agency are set forth in the inclosed communications, together with the reply of the Chief of Engineers to the Secretary of the Interior. The environmental statement required by the National Environmental Policy Act of 1969 has been submitted to the Council on Environmental Quality.

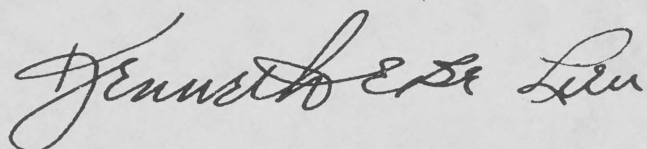
Since this project meets all the requirements of Section 201 of the Flood Control Act of 1965 and involves little or no controversy, I recommend that the project be approved for appropriations.

Subsequent to preparation of the report of the Chief of Engineers, a new interest rate has been adopted for computing annual costs and benefits. Use of the currently prescribed rate of 5-1/2 percent would not significantly affect the benefit-cost ratio.

The Office of Management and Budget advises that there is no objection to the submission of the proposed report to the Congress; however, it states that no commitment can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the

President's budgetary objectives as determined by the then prevailing fiscal situation. A copy of the letter from the Office of Management and Budget is inclosed as part of the report.

Sincerely,

A handwritten signature in cursive script, reading "Kenneth E. Belieu". The signature is written in dark ink and is positioned to the right of the typed name.

1 Incl
As stated

KENNETH E. BELIEU
Acting Secretary of the Army

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF MANAGEMENT AND BUDGET

WASHINGTON, D.C. 20503

August 17, 1972

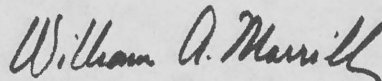
Honorable Robert Froehlke
Secretary of the Army
Washington, D.C. 20310

Dear Mr. Secretary:

Mr. Kenneth Belieu's letter of August 11, 1972, submitted the favorable report of the Chief of Engineers on Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, authorized by the Flood Control Act, approved July 24, 1946.

I am authorized by the Director of the Office of Management and Budget to advise you that there would be no objection to the submission of the proposed report to the Congress. No commitment, however, can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation.

Sincerely yours,



William A. Morrill
Assistant Director

COMMENTS OF THE GOVERNOR OF MISSOURI



Warren E. Hearnes
Governor

Executive Office
Jefferson City
Missouri

January 13, 1972

Lieutenant General F. J. Clarke
Chief of Engineers
Office of the Chief of Engineers
Washington, D. C. 20314

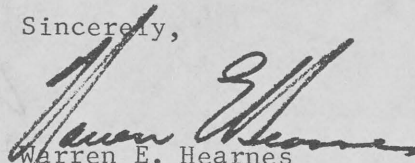
Dear General Clarke:

Your Survey Report on Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, has been received and reviewed by the appropriate agencies of the State.

This letter is to inform you that I concur in your recommendations and to farther advise that I am pleased with your treatment of the environmental factors associated with the project.

I urge early authorization and funding of your proposal.

Sincerely,


Warren E. Hearnes
Governor

COMMENTS OF THE STATE OF ILLINOIS

RICHARD B. OGILVIE
Governor



RAY C. DICKERSON
Director

STATE OF ILLINOIS

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

March 15, 1972

Lieutenant Colonel Leon E. McKinney
Assistant Director of Civil Works
for Mississippi Valley
Office of the Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear Colonel McKinney:

Reference is made to your letter of February 25, 1972, File DAEN-CWP-D, requesting State comment on the proposed report of the Chief of Engineers with accompanying papers, on Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri. The Illinois Natural Resource Development Board has reviewed both the report and the environmental impact statement thereon and has no adverse comment to make in regard to either.

Sincerely,

A handwritten signature in cursive script that reads "Ray C. Dickerson".
Ray C. Dickerson

COMMENTS OF THE DEPARTMENT OF THE INTERIOR



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

April 5, 1972

Dear General Clarke:

This is in reply to your letter of October 26, 1971, requesting our views and comments on the proposed report on the Perry County Drainage and Levee Districts Numbers 1, 2 and 3. We have completed our review of the report and related information and submit the following comments for your consideration and use.

The proposed report does not recommend any recreation development. As the project does not afford much opportunity for any significant recreation development, we concur with the plan as formulated. The proposed plan does not impact on any Indian lands under our jurisdiction.

We are pleased to note your plans for developing a program emphasizing the establishment and preservation of wildlife cover as part of the maintenance of this project. We further understand that you plan to develop and present this program to the Levee District Commissioners during the pre-construction phase of planning. While the program has the full support of this Department, we would prefer to see it made an integral part of the plan of development which is to be submitted to Congress for approval. Federal participation in the overall plan would then be contingent upon the implementation of all components, including the wildlife program. Hence, we urge you to modify your recommendation for this plan of development so that the wildlife program will become an integral part of the overall project.

We have reviewed the draft environmental statement for this project and submit the following comments as to the adequacy of this statement in covering environmental considerations.

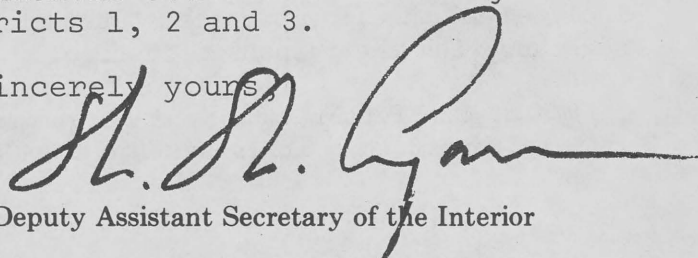
The draft statement recognizes that no existing or proposed units of the National Park System or sites eligible or potentially eligible for registration as natural, historic or environmental education landmarks would be adversely affected by this project. The statement also indicates that the State Liaison Officer was consulted and the project does not impinge on any areas listed in the National Register of Historic Places. However, the final statement should clearly document the steps taken to comply with Section 106 of the National Historic Preservation Act of 1966 (PL 89-665). Also, a copy of the comments of the State Liaison Officer for Historic Preservation for the State of Missouri concerning the negative effects of the undertaking upon historic or archeological resources which may be in the process of nomination to the National Register should be included.

The final statement should indicate whether or not any Federally owned or controlled lands would be affected by the proposed action and identify any necessary steps taken to comply with Executive Order 11593, Protection and Enhancement of the Cultural Environment.

We note the draft statement recognizes that the archeological aspects of the project area are not well known and that scattered archeological sites are known to exist in Perry County, Missouri. Recent communication between the National Park Service Midwest Archeological Center and the University of Missouri indicates the probability of archeological sites in the project area. An archeological survey should be conducted to (1) determine the significance and extent of archeological values; (2) provide a basis for evaluating these impacts in terms of the five points set forth in Section 102(2)(C) of NEPA; and (3) define any archeological salvage program needed to mitigate losses to the cultural environment.

We wish to thank you for the opportunity to review your plan of development and environmental statement for Perry County Drainage and Levee Districts 1, 2 and 3.

Sincerely yours,



Deputy Assistant Secretary of the Interior

Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Attn: DAEN-CWP-D
Washington, D.C. 20314

LETTER TO THE SECRETARY OF THE INTERIOR



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

IN REPLY REFER TO
DAEN-CWP-D

10 May 1972

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

This is in reply to the letter from the Department of the Interior commenting on my proposed report on the Perry County Drainage and Levee Districts Numbers 1, 2, and 3.

The Department noted plans for developing a program emphasizing the establishment and preservation of wildlife cover as a part of the maintenance of the project. Although the Department supports this program, it recommends that the wildlife program be made an integral part of the overall project so that Federal participation in the overall plan would then be contingent upon implementation of all components, including the wildlife program.

The plan of improvement that is being recommended includes several features intended to preserve wildlife habitat and the appearance of the area. Shaping and seeding of all project land slopes to prevent erosion, preserving trees, and general landscaping are now normal practices during construction. Implementation of the plan for maintaining wildlife habitat on those lands that would be acquired for construction of the proposed project modification only, is considered to be an integral part of the recommended plan and it is the responsibility of local interests to perform, the same as maintaining channels and pumping stations.

The comments concerning the draft environmental impact statement are included in the final impact statement on the proposed improvements together with the responses thereto.

Copies of the letter from your Department and this reply will be included with my report when it is sent to the Congress.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "F. J. Clarke", is written over the typed name.

F. J. CLARKE
Lieutenant General, USA
Chief of Engineers

COMMENTS OF THE DEPARTMENT OF AGRICULTURE



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

February 4, 1972.

Honorable Robert F. Froehlke
Secretary of the Army

Dear Mr. Secretary:

This is in reply to the Chief of Engineers letter of October 26, 1971, transmitting for our review and comment his proposed report and pertinent papers, including the environmental statement, on Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri.

The proposed project consists of the construction of four pumping stations and two new drainage ditches. The proposed improvement is designed to provide relief from interior flooding on agricultural lands.

The project is recommended as a means of increasing agricultural production and local farm income. The report would be strengthened if it presented the current level of farm income and expected increase in farm income with the proposed project.

The report indicates that about 280 acres of woodland within the districts could be converted to cropland as a result of improved drainage. The report does not contain specific data on forest resource values that would be lost if the project is constructed. We believe that such values should be considered and accounted for in project cost determination.

Enclosed are additional comments regarding the draft environmental statement.

The proposed project will have no adverse effects on projects or programs of the Department of Agriculture.

Thank you for the opportunity to review this material.

Sincerely,

A handwritten signature in cursive script, reading "T. K. Cowden", is written over a horizontal line.

T. K. COWDEN
Assistant Secretary

Additional Comments on Draft Environmental Statement

Perry County Drainage and Levee
Districts Nos. 1, 2, and 3, Missouri

The associated environmental impact statement would benefit from the following revision:

Footnote 1, page 2, is both misleading and inconsistent with the projections report that is cited. The projections indicate that it is not necessary to cultivate diverted land intensively in order to obtain the projected agricultural outputs. The report cited specifically projects a decrease in the acreage of total cropland harvested and used for pasture from 1959 through 2020. Even though the projected production in 2020 is more than double that of 1959-61, this increase is more than offset by the increase in projected agricultural productivity. Our specific recommendation is to omit the entire footnote, and to adjust the text, beginning at the bottom of page 1, to read: "Currently about 97 percent of the land in the district is either devoted to agricultural production, principally cash grains (soybeans, corn and wheat) and alfalfa, or diverted from production under current agricultural programs. About 1 percent . . .".

In the section describing alternatives, the alternatives of flood insurance and zoning management mentioned in the main body of the project report should be presented along with an estimate of their comparative environmental effects. As it stands, this section's wording implies that the only alternative to the proposed project is to do nothing, a course that is predicted to result in local wasted labor and psychological stress.

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (WS/83)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: 426-2262

SA 0714

Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Washington, D. C. 20314

23 December 1971

Dear General Clarke:

This is in response to your letter of 26 October 1971 addressed to Secretary Volpe concerning the flood control project for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Perry and Randolph Counties, Missouri and Illinois respectively.

The concerned operating administrations and staff of the Department of Transportation have reviewed both the environmental impact statement and survey report and other than to recommend and concur with the project, this Department has no comments to make.

The opportunity for this Department to review the draft statement and survey report for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3 is appreciated.

Sincerely,

W. M. BENKERT
Rear Admiral, U.S. Coast Guard
Chief, Office of Marine Environment
and Systems

COMMENTS OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

WASHINGTON, D.C. 20201

OFFICE OF THE SECRETARY

March 20, 1972

F. J. Clarke
Lieutenant General, USA
Chief of Engineers
Washington, D. C. 20314

Dear Lt. Gen. Clarke:

Secretary Richardson has asked me to respond to your letter of October 26, 1971, wherein you requested comments on the draft environmental impact statement for Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri.

This Department has reviewed the health aspects of the above project as presented in the documents submitted. This project does not appear to represent a hazard to public health and safety.

The opportunity to review this draft environmental impact statement is appreciated.

Sincerely yours,

A handwritten signature in cursive script, reading "Merlin K. DuVal".

Merlin K. DuVal, M.D.
Assistant Secretary for
Health and Scientific Affairs

cc: Cong. Bill D. Burlison

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE — ROOM 249
KANSAS CITY, MISSOURI — 64108



IN REPLY REFER TO: AWRP-PLAN

December 30, 1971

Lieutenant General F.J. Clarke
Chief of Engineers
Department of the Army
Washington, D.C. 20314

Dear General Clarke:


Your letter of October 26, 1971, to Mr. William D. Ruckelshaus requesting our comments on Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri has been referred to this office.

In connection with the Survey Report for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3, we conclude that the proposed works of improvement will not have any significant adverse effect on water quality enhancement.

The draft Environmental Impact Statement appears to be a thorough and objective response to Section 102 (2) (c) of the National Environmental Policy Act of 1969.

We appreciate the opportunity to review and comment on these documents. Please provide us with a copy of the final Environmental Impact Statement as submitted to the President's Council on Environmental Quality.

Very truly yours,


CHARLES H. HAJINIAN
Chief, Program
Planning Branch

ORIGINAL ARTICLES

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PERRY COUNTY DRAINAGE AND LEVEE DISTRICTS
NOS. 1, 2, AND 3, MISSOURI

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY



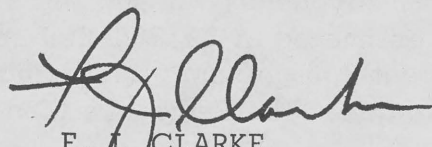
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

IN REPLY REFER TO

May 11, 1972

SUBJECT: Perry County Drainage and Levee Districts Nos. 1, 2, and 3,
Missouri
THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on a survey of Perry County Drainage and Levee Districts Numbered 1, 2, and 3, Missouri, in the interest of flood control, authorized by the Flood Control Act approved 24 July 1946. My report includes the reports of the District and Division Engineers and the Board of Engineers for Rivers and Harbors.
2. The District and Division Engineers recommend that the existing project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3 be modified to provide for interior flood control by construction of a pumping station and appurtenant facilities, adjacent to each of the existing gravity outlets for Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff drainage areas, including approximately 13,900 feet of new diversion ditches, at an estimated net cost to the United States of \$2,670,000 for construction and a non-Federal cost of \$28,000. The reporting officers estimate the annual charges to be \$230,600, based on an interest rate of 5-1/8 percent. The annual benefits are estimated to be \$348,400. The benefit-cost ratio is 1.5.
3. The Board of Engineers for Rivers and Harbors concurs in general with the reporting officers and recommends the improvements at an estimated cost to the United States of \$2,670,000 for construction, subject to certain requirements of local cooperation. The Board notes that application of the now current interest rate of 5-3/8 percent does not change the benefit-cost ratio.
4. I concur in the views and recommendations of the Board.


F. J. CLARKE
Lieutenant General, USA
Chief of Engineers

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

ENGBR (30 Jun 71) 2d Ind

SUBJECT: Survey Report on Interior Flood Control Improvements - Perry
County Drainage and Levee Districts Nos. 1, 2, and 3,
Missouri

Board of Engineers for Rivers and Harbors, Washington, D. C. 20315
22 September 1971

TO: Chief of Engineers, Department of the Army

1. Perry County Drainage and Levee Districts Nos. 1, 2, and 3 lie in the Mississippi River flood plain in Perry County, Missouri, and Randolph County, Illinois, between river miles 95 and 111 above the Ohio River. The project area is approximately 15 miles long, 1 to 4 miles wide, and contains 26,881 acres of highly productive bottom land. About 30 acres of adjacent hill land drain into the districts. Drainage from 71,500 acres of hill and bluff land, formerly tributary to the districts, has been diverted into a 15.5-mile long diversion channel constructed by local interests at the base of the bluffs. A Federal levee project protects the districts against flooding from the Mississippi River and from the diversion channel. Drainage from within the districts is passed through the levee at 16 gravity drainage outlet structures. Land elevations within these districts vary from about 355 to 380 feet, mean sea level. The land generally slopes from the river toward the bluffs, and land surfaces are successions of gently undulating ridges and swales. Annual rainfall has varied from a maximum of 68.8 inches in 1858 to a minimum of 20.6 inches in 1953.

2. The existing Federal flood control project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3 provides for raising, enlarging, and extending about 33 miles of riverfront, flank, and back levees, and for appurtenant works consisting of gravity drainage structures, highway and railroad closure structures, and the surfacing of service roads on the levee crown. Construction was initiated in 1937 and completed in 1968. The main interior drainage ditches, constructed by local interests, are generally in good condition.

3. The levee districts' economy is essentially agricultural with nearly 97 percent of the land devoted to agricultural production. The crops grown are corn, soybeans, wheat, and alfalfa. The value of agricultural production is estimated at \$2,500,000 annually. The population of the districts is about 350 persons, including the villages of McBride, Claryville, and Belgique. The Perryville Municipal Airport is located within

the area. In addition to several establishments which process agricultural products, there are two commercial firms -- a jet aircraft engine repair shop and a plastic wall panelling manufacturing company. The districts are interlaced with good roads and the area is served by the main line of the St. Louis-San Francisco Railway.

4. Although the hazard of direct flooding from the Mississippi River has been substantially reduced by the existing levee project, the problem of removing interior drainage remains. While intense storm rainfall has caused short duration overflow of the ditch systems coincident with low Mississippi River stages, the most extensive and damaging flooding occurs when the runoff from rainfall and seepage is blocked by higher river stages. Initial blockage occurs when river stages exceed 13 feet on the Chester, Illinois, gage located at river mile 109.5. The heaviest rains occur during June, July, and August. About 93 percent of the districts' area drains into four drainage systems, identified as Ditch A (also called Bois Brule), Missouri Chute, Cinque Hommes Creek, and Jones Cutoff, and the remainder of the area drains through six small ditch systems or natural swales to outlets through the levee. These six small areas have been combined with the four major drainage areas for study purposes. Consideration has been given to utilizing existing ditches or natural drainage courses between the minor and major ditch systems and the construction of new diversion ditches.

5. Based on an analysis of flood conditions over a 57-year period of record, adjusted to reflect existing Mississippi River channel conditions, flooding from impounded interior runoff would have occurred almost every year. Under existing conditions, some 5,850 acres are flooded annually, on the average, and over 12,000 acres are subject to flooding from an extreme flood event. Damages are principally to crops although some farm properties are damaged occasionally. Under 1970 conditions, average annual damages are estimated to be \$300,900 to crops and \$7,500 to property, totalling \$308,400.

6. Local interests desire the installation of pumping facilities which would alleviate the damages during periods of blocked drainage.

7. The District Engineer finds that the most suitable plan for reducing impoundment flooding would be to provide pumping plants adjacent to the existing gravity outlets for Ditch A, Missouri Chute, Cinque Hommes, and Jones Cutoff areas; and that the greatest excess of benefits over costs would be realized with pumping capacities of 100, 60, 130, and 115 cubic feet per second, respectively. He also finds that approximately 13,900 feet of new ditches would be required to convey runoff to the pumping stations. The District Engineer proposes to raise the grade of the levee 2 feet for a distance of 1,000 feet on each side of the pumping plants to prevent possible overtopping in that vicinity.

8. About 97 percent of the land is devoted to agricultural production; about 2 percent is occupied by farmsteads, villages, roads, a railroad, and ditches; and the remaining area, about 280 acres, is in marginal brushland or woodlots. It is anticipated that with the advent of better drainage some of the marginal lands will be converted to cropland, but much of it will remain unimproved. The 25 acres of land occupied by the proposed improvement will be lost from its present use. It is considered that the overall environmental effect of the improvement on the area's natural systems will be negligible. A wildlife management program, emphasizing the establishment and preservation of wildlife cover as part of the maintenance of project facilities, will be developed and presented to the levee district commissioners during the pre-construction planning phase.

9. The District Engineer estimates the total first cost of the proposed improvements, based on July 1971 price levels, at \$2,698,000, of which \$2,670,000 would be the Federal share and \$28,000 would be the non-Federal share of the construction cost. Based on an interest rate of 5-1/8 percent and a 100-year period of analysis, the annual charges are estimated at \$230,600, including a non-Federal cost of \$91,300 for operation, maintenance, and replacements. The average annual benefits are estimated to be \$348,400, of which 69 percent is creditable to damages prevented to development expected to exist at the beginning of project life; 15 percent is

creditable to damages prevented to future development; and 16 percent is creditable to increased land returns after project installation. The benefit-cost ratio for the proposed improvements is 1.5. The District Engineer recommends the improvement in accordance with his plan, subject to certain conditions of local cooperation. The Division Engineer concurs.

10. The Division Engineer issued a public notice stating the recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. No communications have been received.

Views and Recommendations of the Board of Engineers for Rivers and Harbors.

11. Views.--The Board of Engineers for Rivers and Harbors concurs in general in the plan of improvement proposed by the reporting officers. The plan is economically justified and the requirements of local cooperation are appropriate. The Board notes that alleviation of flooding would create an incentive for farmers to improve and intensify cropping practices conducive to higher returns. The Board carefully considered the environmental effects of the proposed improvements, including those discussed in the preliminary draft environmental statement dated 25 June 1971. It concurs in the views of the reporting officers that positive measures should be undertaken to minimize any adverse effects during construction, that wildlife food and cover plantings should be established in the project areas consistent with their primary function and that a plan of wildlife management should be developed for use by local interests in the maintenance of the project. It concludes that the anticipated land use changes would have a negligible environmental effect on the area's natural systems. Application of the now current 5-3/8 percent interest rate results in annual benefits of \$343,300, annual costs at \$236,700, and a benefit-cost ratio of 1.5.

12. Recommendations.--Accordingly, the Board recommends that the existing project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, be modified to provide for: construction of pumping stations and appurtenant diversion ditches to the existing outlets of the Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff drainage areas, with

pumping capacities of 100, 60, 130, and 115 cubic feet per second, respectively; and raising the existing levee grade for a distance of 1,000 feet on each side of the four pumping stations; all generally in accordance with the plan of the District Engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost to the United States of \$2,670,000 for construction: Provided that, prior to construction, local interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project;

b. Hold and save the United States free from damages due to the construction works;

c. Maintain and operate the project, including the pumping stations, after completion in accordance with regulations prescribed by the Secretary of the Army;


d. Clean silt and debris from existing ditches, on a continuing maintenance basis, as necessary, to provide unrestricted flow to the pumping stations;

e. Prevent obstruction or encroachment in channels necessary for proper functioning of the project;

f. Comply with all applicable provisions in the Uniform Relocation Assistance and Real Property Acquisition Act of 1970; and

g. At least annually, inform interests affected that the project will not provide complete protection against flooding.

FOR THE BOARD:



W. ROPER
Major General, USA
Chairman

ENVIRONMENTAL STATEMENT

FINAL

ENVIRONMENTAL STATEMENT

PERRY COUNTY DRAINAGE AND LEVEE DISTRICTS

NOS. 1, 2, and 3, MISSOURI

OFFICE OF THE CHIEF OF ENGINEERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 20314

May 1972

Perry County Drainage and Levee Districts
Nos. 1, 2, and 3, Missouri

() Draft

(X) Final Environmental Statement

Responsible Office: U. S. Army Engineer District, St. Louis, Missouri

1. Name of Action: () Administrative (X) Legislative

2. Description of Action: The recommended plan of improvement consists of construction of four pumping stations ranging in size from 60 c.f.s. to 130 c.f.s., and two new drainage ditches totalling 13,900 feet in length. The improvement is located in Perry County, Missouri and Randolph County, Illinois.

3. a. Environmental Impacts: Improvements will reduce the average area flooded annually from 5,850 acres to 2,420 acres. It is anticipated upon the advent of better drainage, some of the districts' 280 acres of scattered tracts of brush and forest land may eventually be converted to cropland.

b. Adverse Environmental Impacts: Aside from initial decline of some wildlife populations, the improvement will have a minimal adverse effect on ecological systems in the area.

4. Alternatives: No development.

5. Comments Received:

Department of the Interior
Department of Agriculture
Environmental Protection Agency
Department of Health, Education,
and Welfare
Department of Transportation
State of Illinois
State of Missouri

6. Draft Statement of CEQ 26 October 1971.
Final Statement of CEQ .

Perry County Drainage and Levee Districts
Nos. 1, 2, and 3, Missouri

ENVIRONMENTAL STATEMENT

1. Project Description. Perry County Drainage and Levee Districts Nos. 1, 2, and 3 are located in Perry County, Missouri, and Randolph County, Illinois, on the right bank of the Mississippi River between river miles 95 and 111, above the Ohio River. The districts are protected against flooding from the Mississippi River by a Federal project completed in 1968, which provided for the raising or reconstruction of 33.1 miles of levee and appurtenant works. The levee provides protection against floods equal to a stage of 46.6 feet at Chester, Illinois. The three districts have a combined length of about 15 miles, vary in width from about 1.3 to 4.1 miles and contain an area of 26,881 acres of highly developed agricultural land. The proposed improvement, recommended as a modification of the levee project, is designed to provide relief from interior flooding on the agricultural lands within the districts. The recommended plan of improvement consists of construction of four pumping stations ranging in size from 60 c.f.s to 130 c.f.s. and two new ditches totalling 13,900 feet in length.

This survey was authorized by Section 11 of the Flood Control Act of 24 July 1964 (P.L. 526, 79th Congress, 2nd Session). This improvement is in the preauthorization stage and has a benefit-to-cost ratio of 1.5 to 1.

2. Environmental Setting Without the Project. The Perry County Drainage and Levee Districts contain 26,881 acres of productive alluvial soils, bordered on the east by the Mississippi River and to the west by a diversion channel at the limestone bluffs. Currently about 97 percent of the

land in the districts is either devoted to agricultural production, principally cash grains (soybeans, corn, and wheat) and alfalfa, or diverted from production under current agricultural programs. About 1 percent of the land is brush and forest, and the remaining 2 percent is in ditches, roadways, farm sites, villages, and railways. The total population of the drainage districts is estimated to be about 350, including the towns of McBride, Claryville and Belgique. The residents of the area are principally involved in agricultural production, agri-business pursuits, and associated rural community services. The Perryville Municipal Airport and two small light industries are located in the protected area, and add diversity to the local employment situation. Excluding small residential lots, there are 217 landowners in the district. Tracts are generally small, the largest being 499 acres. Holdings of individual landowners range in size from a few acres to 2,165 acres with the latter consisting of 16 widely separated tracts.

The most productive wildlife habitat in this region is found along the bluff line and on the unprotected areas of the flood plain. Wildlife productivity within the levee is severely limited by the scarcity and distribution of cover. Common tree species in the districts are cottonwood, willow, maple, sycamore, green ash, hackberry, and pin oak. These are concentrated in several small woodlots throughout the area. Principal wildlife species include

bobwhite quail, cottontail rabbits, raccoons, tree squirrels, and a variety of song birds. Wildlife populations in this area are largely dependent upon the woodland resources for cover, and utilize the surrounding cropland for a food supply. This area does not provide important habitat for any endangered species. Insect vector and other animal pest problems associated with flooding within the levee districts are not significant.

No natural flowing streams remain within the levee districts, and all natural drainage ways have been considerably altered from their original condition. Although drainage ditches and borrow pits in this area do provide some standing water, the fishery resource is unmanaged and the potential sport fishery is extremely limited. Virtually all of the fishing pressure in this area is absorbed by the adjoining Mississippi River and its tributaries and sloughs. These wet areas receive minimal use by waterfowl because of a general lack of available food and cover.

A high degree of flood protection from the Mississippi River was provided upon completion of the existing levee in 1968. However, substantial and repetitive damages have occurred due to blocked drainage through the levee when Mississippi River stages exceed 13 feet at Chester, Illinois. An average of approximately 5,850 acres are flooded annually as a result of this blocked drainage and about 12,250 acres are subject to inundation by the maximum flood occurrence. The flood damages suffered are primarily confined to growing crops with minimal damage to residences, businesses and transportation facilities. Local interests desire alleviation of flooding conditions and, particularly, the installation of pumps to reduce damage due to impoundment.

3. Impact Statement. The following information is furnished in response to Section 102 (2)(c) of the National Environmental Policy Act of 1969.

a. Identify "The environmental impact of the proposed action." The proposed improvements would reduce the average area of cropland flooded annually from 5,850 acres to 2,420 acres, permitting more efficient utilization of the agricultural soils available in this area. It is anticipated that upon the advent of better drainage some of the districts' 280 acres of brush and forest land may eventually be converted to cropland. These land conversions will have a generally depressing effect on the area's already limited wildlife populations, as they represent a loss of cover. Additionally, the clearing and enlarging of drainage ditches will temporarily eliminate several acres of wildlife cover. Although these land conversions are incidental to this project, they probably would not occur if the project was not built. It is impossible to determine the amount of woodland that will be cleared, as this will depend on economic demands and the decisions of individual landowners, but it should be noted that even with the improved drainage, most of this land will remain too wet to farm.

The limited extent of wildlife habitat losses on this area is not considered sufficient to require mitigatory measures. However, a thorough evaluation of potential action to enhance wildlife populations within the districts was made and the following steps will be undertaken: a) A plan of recommended wildlife management practices emphasizing the establishment and preservation of wildlife cover in the maintenance of project facilities will be developed during the preconstruction planning phase and presented to the levee district commissioners. b) Wildlife food and cover plantings, compatible with drainage functions, will be established along the spoil banks of 13,900 feet of new ditches. c) Low maintenance wildlife food and cover plants will be established in the area around the pumping station. d) Landowners will be encouraged to contact the Missouri Department of

Conservation for assistance and advice in retaining and enhancing wildlife habitat within the districts.

The overall environmental impact of this project on the area's natural systems will be negligible, as the primary effect will be to reduce flooding on cultivated lands. The project does not impinge on any National Historic Landmarks or areas listed in the National Register of Historic Places. No significant historical, cultural, or biological sites will be disturbed, and the project will not exert an adverse esthetic impact on the area. The archeological aspects of the project area are not well known. Scattered archeological sites are known from Perry County, Missouri, and the appropriate authorities will be contacted to determine their exact locations and thus avoid disruption of these sites during construction.

b. Identify "any adverse environmental effects which cannot be avoided should the plan be implemented." About 280 acres within the districts are currently brush and forest lands and improved drainage will result in the eventual conversion of some of this land to cropland. This represents a loss of small game cover, and will be offset by the implementation of the steps described in paragraph 3a above.

c. Identify "alternatives to the proposed action." There is no practical structural solution to the problem of interior drainage in the levee districts which precludes a system of ditches and pumping stations. Detention reservoirs were not considered because the watershed which drains into the districts contains less than 30 acres.

The alternative of no structural developments would commit approximately 3,430 acres of potentially highly productive farmland to a less productive agricultural use. Under such a plan, the preventable economic damages, wasted human labors and psychological stresses associated with flooding on cultivated

lands will continue. On balance, the natural values endangered by this project are minimal, and are offset by the improvement in the resource potential of high quality agricultural land.

d. Discuss "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity."

Some loss of wildlife habitat is expected in favor of increased agricultural production, and it is unrealistic to assume that this conversion is temporary. The remainder of the affected lands will be relieved of periodic inundation, a condition which will permanently benefit local crop production and thereby improve the quality of man's environment in that area through an increase in economic return and a decrease in wasted labor.

e. Identify "any irreversible or irretrievable commitment of resources which would be involved in the proposed action, should it be implemented."

Those irretrievable or irreversible commitments of resources involved in this project will be the commitment of labor, material, and about 25 acres of land associated with construction. An undetermined amount of the districts' 280 acres of brush and forest land will be lost, over time through conversion to cropland.

4. Coordination With Others.

a. Public Participation. Two public meetings were held on this project. The first was held on 17 September 1948 at the initiation of the study and the second on 28 April 1971 to discuss the proposed plan of improvement. The environmental aspects of the plan were thoroughly discussed at the April 1971 meeting by the Director of the Missouri Water Resources Board and the District Engineer. Local interests present at that meeting made no expressions of interest in the environmental aspects of the proposed improvement, and no environmental concerns have surfaced since that time.

b. Government Agencies. The Draft Environmental Statement was sent to the following governmental agencies requesting their views and comments.

U. S. DEPARTMENT OF AGRICULTURE; FOREST SERVICE

Comment: Because of the loss to remaining brush and forest lands, it is recommended that the Environmental Statement include a discussion of the need for the preparation of a wildlife management plan.

Response: These topics are addressed in paragraphs 3a and 3b of the revised Environmental Statement.

U. S. DEPARTMENT OF AGRICULTURE; SOIL CONSERVATION SERVICE

Comment: The project should assume some responsibility for the 280 acres of woody vegetation which could be significant from a wildlife natural systems or esthetic standpoint.

Response: These comments are addressed in paragraphs 3a and 3b of the revised Environmental Statement.

U. S. ENVIRONMENTAL PROTECTION AGENCY

Comment: The proposed improvements should have no significant effect on water quality or offer any opportunity for enhancing water quality.

U. S. DEPARTMENT OF THE INTERIOR; GEOLOGICAL SURVEY

Comment: The proposed project will have no significant effect on water resources of the area.

U. S. DEPARTMENT OF THE INTERIOR; BUREAU OF MINES

Comment: The project will not affect or be affected by mineral production.

U. S. DEPARTMENT OF THE INTERIOR; NATIONAL PARK SERVICE; NORTHEAST REGION

Comment: The Environmental Statement should note that the project in Illinois does not impinge on any National Historic Landmarks and should include a statement from the State Liaison Officer for Historic Preservation that no items on the State Register of Historic places are endangered. Thirdly, it should mention that no esthetic or visual landform values will be impaired.

Comment: These comments are addressed in paragraph 3a of the revised Environmental Statement.

U. S. DEPARTMENT OF THE INTERIOR; NATIONAL PARK SERVICE, MIDWEST REGION

Comment: No existing or studied units of the National Park System would be affected by the proposal. Also, no sites eligible for the Registered National Landmark program would be affected. The State Liaison Officer for the National Register of Historic Places should be consulted for local and archeological values.

Response: The State Liaison Officer for the National Register of Historic Places was contacted in response to this comment.

U. S. DEPARTMENT OF THE INTERIOR; BUREAU OF OUTDOOR RECREATION

Comment: The statement that the conversion of woodland to cropland is incidental to this project should be clarified, as this conversion would not take place unless the project was implemented.

Response: Paragraph 3a of the Environmental Statement has been modified to be responsive to these comments.

U. S. DEPARTMENT OF THE INTERIOR; BUREAU OF SPORT FISHERIES AND WILDLIFE

Comment: The economic benefits of the project are limited to the life of the project, and ecologically speaking, represent a relatively short-term gain.

Response: With proper maintenance and management, the benefits derived from these improvements should far exceed the economic life of the project.

STATE OF MISSOURI; WATER RESOURCES BOARD

Comment: The Water Pollution Board has advised that the preliminary draft of the Environmental Statement is adequate.

Comment: The proposed improvements will not materially change the area's ecosystem, which is a result of present use.

STATE OF MISSOURI; DEPARTMENT OF CONSERVATION

Comment: The Department of Conservation does not agree with the statement in paragraph 3a that the "overall environmental effect of this project on the areas natural systems will be negligible . . ." In their opinion, the 3,430 acres of land that will be more efficiently farmed is not negligible nor is the loss of 3 280 acres of brush and woodland.

Response: The 3,430 acres to be more effectively farmed are currently in agricultural production, and do not represent a loss of wildlife land. Some loss of the 280 acres of brush and forest land in the district is likely as a result of improved drainage. However, most of this land will still be too wet to farm, and should remain as wildlife lands. These areas do not provide high quality habitat and their principal value lies in the fact that they provide cover for wildlife species feeding in adjacent croplands.

The anticipated loss to wildlife could be partially offset by the procedures discussed in paragraph 3b. These plans will emphasize the establishment and preservation of wildlife food and cover species.

Comment: The conversion of 280 acres of woodlands and the clearing of drainage ditches may be incidental to the project, but would not occur if the project was not built.

Response: The Environmental Statement has been modified to reflect these considerations.

Comment: Wildlife habitat should be planted along the cleaned-out ditches to hasten their recovery.

Response: The clearing of drainage ditches is an activity that will be initiated by private interests on private lands. However, wildlife plantings, compatible with the drainage purposes of the ditches, will be recommended to the district's commissioners. Wildlife food and cover species will be established along the 13,900 feet of new ditches recommended by this project.

Comment: The words "improve the quality of man's environment" in the second sentence of paragraph 3d should be amended to read "improve man's economic return."

Response: This change is not made because it is believed that the project will improve the quality of man's environment.

Comment: There is some good wildlife habitat adjacent to Cinque Hommes Creek. This area and some of the areas adjacent to the pumping station could be utilized for wildlife habitat improvement. This could offset most of the detrimental effects of the project on wildlife resources.

Response: Recent reconnaissance of Cinque Hommes Creek indicates very little wildlife habitat still exists in this area. Regardless, this is private land and wildlife enhancement practices in this area must be initiated and financed by local owners. However, wildlife food and cover will be established along the new drainage ditches and at the pumping station sites contained in the improvement. Additionally, a wildlife management plan recommending wildlife management practices in the operation and maintenance of project facilities will be developed and presented to the levee districts' commissioners.

STATE OF MISSOURI; DIVISION OF GEOLOGICAL SURVEY AND WATER RESOURCES

Comment: No comments are offered on the Environmental Statement.

STATE OF MISSOURI; DEPARTMENT OF PUBLIC HEALTH AND WELFARE

Comment: Construction activities might result in the creation of shallow water areas and, consequently, increase mosquito production.

Response: The purpose of this project is to reduce the extent and frequency of standing water within the districts. This should reduce the mosquito population. Any shallow water areas created during construction will be drained.

Comment: Construction could result in an increase in turbidity in the river water.

Response: Virtually all of the construction will be within the protected area and should result in very little increase in turbidity in the Mississippi River. Positive action to retard erosion will be included in construction specifications.

Comment: The discharges of pumping stations could concentrate wastes at a sufficient level to create a problem in the river.

Response: There is no reason to believe that this project will result in an increase in waste discharges into the Mississippi River. The U. S. Environmental Protection Agency (letter 26 March 1971 attached), concurs in this analysis.

STATE OF MISSOURI: STATE PARK BOARD

Comment: No comments on the Environmental Statement are offered.

STATE OF ILLINOIS: DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

Comment: The Illinois Natural Resource Development Board has reviewed the statement and has no comments to offer.

c. Coordination of Draft Environmental Statement at Department Level.

Correspondence from interested State and Federal agencies consulted during Departmental review are attached as inclosures to the environmental statement. Agency comments concerning the environmental aspects of the project and the response of the Chief of Engineers are discussed below.

THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

Comment: The Department reviewed the health aspects of the project and environmental statement and concluded there would be no hazard to public health and safety.

THE DEPARTMENT OF TRANSPORTATION

Comment: Recommends and concurs in the project and environmental statement.

THE ENVIRONMENTAL PROTECTION AGENCY

Comment: Concluded that the project will have no significant adverse effect on water quality enhancement and that the environmental statement is a thorough and objective response to NEPA.

THE DEPARTMENT OF AGRICULTURE

Comment: Suggests deletion of a footnote and a clarifying change of language dealing with the extent of lands devoted to crop production.

Response: The final statement incorporates these suggested changes.

Comment: The Department states that the environmental statement should discuss the alternatives of flood insurance and zoning and their environmental effects.

Response: The project consists of 4 pumping stations to reduce interior ponding behind the existing main line levees along the Mississippi River. As noted by the Department, 97 percent of the lands in the district are devoted to agricultural production or currently diverted from such production under existing agricultural programs. Hence the lands appear to have been effectively zoned for agriculture. Flood insurance for crops is not available under Federal programs and would be prohibitively expensive from private carriers. In any case, insurance does not alleviate flooding; it merely distributes the losses to all interests underwriting program costs.

THE DEPARTMENT OF THE INTERIOR

Comment: Suggests the environmental statement should include correspondence with the State Liason Officer for Historic Preservation for the State of Missouri noting that the project would have no adverse effects on historic or archeological resources which may be nominated to the National Register of Historic Places.

Response: Since the State Liason Officer advised and the statement notes that there would be no such adverse effects, and since the Department does not take issue with the facts as presented, the inclusion of this type of correspondence does not appear warranted.

Comment: The Department notes that recent communication between the Midwest Archeological Center and the University of Missouri indicates the probability of archeological sites in the project area, and states that an archeological survey should be conducted and any necessary salvage accomplished.

Response: These activities are the responsibility of the National Park Service pursuant to the Historic Sites Act of 1935. In the event this project is authorized by Congress, appropriate officials of the National Park Service will be advised of work schedules in time to permit the necessary archeological survey and salvage to be accomplished prior to the initiation of construction.

STATE OF ILLINOIS: DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

Comment: The Director in his official capacity as spokesman for the Governor of Illinois, has no adverse comments with respect to the report or environmental statement.

STATE OF MISSOURI

Comment: The Governor concurs in the recommendations and expresses pleasure with the treatment of environmental factors.

CORRESPONDENCE RECEIVED FROM INTERESTED
STATE AND FEDERAL AGENCIES AS A RESULT
OF COORDINATION OF THE PRELIMINARY
DRAFT ENVIRONMENTAL STATEMENT BY THE
ST. LOUIS DISTRICT ENGINEER

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Northeastern Area, State & Private Forestry
6816 Market St., Upper Darby, Pa. 19082

REPLY TO: 3560 Interagency Programs

April 19, 1971

SUBJECT: Corps Environmental Statement
Perry County Drainage and Levee Project,
Districts Nos. 1, 2, and 3



TO: Colonel Carroll N. LeTellier
District Engineer
Dept. of the Army
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

We have reviewed the subject material listed above and have the following comment:

All of our comments center around the fact that the remaining forest and brush wildlife cover will probably be lost due to increased use of the land for crop production. Your statement ably points this out. In order to give this point further consideration we would like to see your Environmental Statement include a discussion on the need for the preparation of a wildlife management plan for the area influenced by this project.

Thank you for the opportunity to review and comment on this Environmental Statement.

Sincerely,

Frank J. Paradise

FRANK J. PARADISE
Assistant Area Director
Division of Flood Prevention &
River Basin Programs

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Post Office Box 459
Columbia, Missouri 65201

April 16, 1971

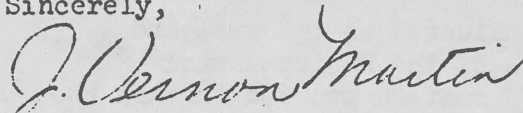
Colonel Carroll H. LeTellier
District Engineer
Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

We have reviewed the Environmental Statement for Perry County
Drainage and Levee Districts Nos. 1, 2, and 3.

We have noted comments on page 3, section 3b, of the attached
statement. Although eventual conversion of the 280 acres to
cropland is incidental to the project, we do not feel that this
should absolve the project from some responsibility for the
expected loss of woody vegetation which could be significant
from a wildlife, natural systems, or aesthetic standpoint.

Sincerely,



J. Vernon Martin
State Conservationist

Attachment

UNITED STATES OF AMERICA
ENVIRONMENTAL PROTECTION AGENCY
REGION V

Water Quality Office
33 E. Congress Parkway, Room 410
Chicago, Illinois

March 26, 1971

Colonel C.N. LeTellier
U.S. Army Engineer District, St. Louis
U.S. Army Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Ref. LMSED-BR

Dear Colonel LeTellier:

We are replying to your request for comments on the draft Environmental Statement for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois, as required by Section 102 (2) (c) of Public Law 91-190. These proposed improvements as described in the survey report prepared by your office, should neither have any significant effect on water quality or offer any opportunity for enhancing water quality. Accordingly, the Environmental Statement is adequate regarding water quality considerations, and we have no comments to make.

The above comments are to be considered as informal and in no way reflect official comments of the Environmental Protection Agency which P.L. 91-190 must be provided through the office of the Administrator.

Sincerely yours,
Francis T. Mayo
F.T. Mayo
Regional Director



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 340
Rolla, Missouri 65401

March 26, 1971

District Engineer
U.S. Army, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Ref: LMSD-BR

Dear Sir:

Informal review by this office of your preliminary draft of the Environmental Statement for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois, indicates that this project will have no significant effects on the water resources of the area.

Sincerely,

Anthony Homyk
District Chief

cc: Chief Hydrologist, WRD, USGS
Washington, D.C.
Attn: George H. Davis
Code: 4000 0000



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Intermountain Field Operation Center

BUILDING 20
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Office of
Chief

March 2, 1971

Colonel Carroll N. LeTellier
District Engineer
Department of the Army
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

This is in reply to your February 22 letter to Floyd Everett, formerly of our mineral resources office in Bartlesville, Okla., in which you requested comments on a preliminary draft of an environmental statement for the Perry County Drainage and Levee Districts 1, 2, and 3 in Missouri and Illinois.

Recent mineral production in Perry County, Mo., has been limited to relatively small quantities of stone. The mineral output of Randolph County, Ill., is significantly larger, consisting of coal, stone, petroleum, and sand and gravel. The mineral producers in Randolph County, however, are located east of the Mississippi River, some distance from the project area. It is evident, therefore, that the project would not affect or be affected by mineral production.

Sincerely yours,

O. M. Bishop
O. M. Bishop
Chief, Intermountain Field
Operation Center



United States Department of the Interior

NATIONAL PARK SERVICE

MIDWEST REGION

1709 JACKSON STREET

OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7423 MWR CFA

May 2, 1971

District Engineer
Department of the Army
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Sir:

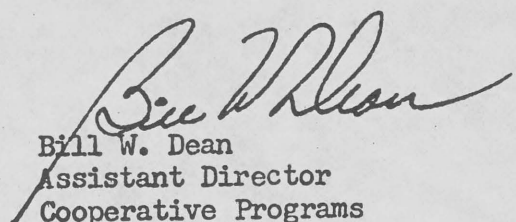
Thank you for the opportunity of reviewing and commenting on your draft Environmental Statement, Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois.

We regret the delay in answering your request brought about by the great number of environmental statements received in this office and the lack of time and personnel.

No existing or studied units of the National Park System would be affected by the proposal. Also, no sites eligible for the Registered National Landmark program would be affected, the Tower Rock National Historic Landmark being located in the vicinity of Wittenburg.

We suggest that if your Dr. Hanley K. Smith has not done so, he consult the Missouri State Liaison Officer for the National Register of Historic Places for local historic and archeologic values. This Officer in Missouri is Mr. Joseph Jaeger, Jr., Director, State Park Board, P. O. Box 176, 1204 Jefferson Building, Jefferson City, Missouri. Mr. Jaeger was appointed by the Governor for matters pertaining to the National Historic Preservation Act of 1966 (P.L. 89-665).

Sincerely yours,


Bill W. Dean
Assistant Director
Cooperative Programs



UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
NORTHEAST REGION
143 SOUTH THIRD STREET
PHILADELPHIA, PA. 19106

IN REPLY REFER TO:

A98

NER(CP)

March 3, 1971

Carroll N. LeTellier
Colonel, CE
District Engineer
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

I sincerely appreciate the opportunity to review your environmental statement on Perry County Drainage and Levee Districts Nos. 1, 2, and 3. Since the state of Missouri is not in the Northeast Region of the National Park Service, I shall limit my comments to Randolph County, Illinois. Perry County will be handled by our Regional Office in Omaha, Nebraska.

Since the statement does not contain a map, my comments will be general in nature. The statement should note positively that it does not impinge on the two National Historic Landmarks in Randolph County. It should also include a statement from the State Liaison Officer for Historic Preservation that no items on the State Register of Historic Places are endangered. Thirdly it should mention that no aesthetic or visual landform values will be impaired.

Sincerely yours,

Harold I. Lessem

Harold I. Lessem

Federal Liaison

Federal, State & Private Agency Assistance



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

LAKE CENTRAL REGION
3853 RESEARCH PARK DRIVE
ANN ARBOR, MICHIGAN 48104

D6427 (SL)

May 7, 1971

District Engineer
U. S. Army Engineer District,
St. Louis
210 North 12th Street
St. Louis, Missouri 63101

Dear Sir:

Thank you for the opportunity to review your environmental impact statement for Perry County Drainage and Levee District Nos. 1, 2, and 3 in Missouri and Illinois, (LMSD-BR), prepared in accordance with Section 102(c) of the National Environmental Policy Act (Public Law 91-190).

Our office has some general comments which are applicable to subsections a, b, d, and e of section 3. In your statement, reference is made to the 280 acres of woodland and idle land which would eventually be converted to cropland. It is further stated that this land conversion is incidental to the project and will occur solely upon the initiation of local landowners. This last statement should be qualified. Although more intensive land development will be incidental to project purposes, such development, in most instances, would not take place unless the project was implemented.

A more complete description of natural resource components should be included in your impact statement, particularly those natural amenities which are an enhancement to landscape features.

We hope these comments will assist you in preparing subsequent drafts of the subject statement.

Sincerely yours,

ROMAN H. KOENINGS
Regional Director

By:

Robert H. Myers
Robert H. Myers
Acting



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

IN REPLY REFER TO:

RB

Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

March 10, 1971

Col. Carroll N. LeTellier
District Engineer
U. S. Army Engineer District
St. Louis
210 North 12th Street
St. Louis, Missouri 63101

Dear Col. LeTellier:

This is in response to your letter of February 22, 1971 (File LMS-ED-BR) requesting our review and comments on the draft environmental impact statement for the Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois.

Our specific comments are keyed to the headings of the draft environmental impact statement.

1. Project Description -

This section is satisfactory.

2. Environmental Setting Without-the-Project -

This section is satisfactory.

3. Impact Statement - Section 102 (2)(c) -

a. Identify "the environmental impact of the proposed action"

The present discussion is accurate and satisfactory.

b. Identify "any adverse environmental effects which cannot be avoided should the plan be implemented"

The present discussion is adequate.

c. Identify "alternatives to the proposed action"

We have no additional project alternatives to suggest.

- d. Discuss "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity"

The discussion is satisfactory. However, the economic benefits of the project are limited to the life-of-the-project, limiting these benefits to a relatively short-term gain, ecologically speaking.

- e. Identify "any irreversible or irretrievable commitment of resources which would be involved in the proposed action, should it be implemented"

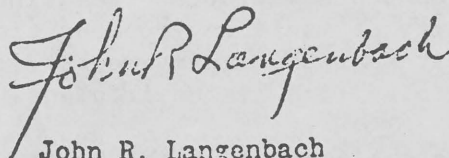
The proposed discussion is adequate. While it is true that the labor committed to a project cannot be recovered, we believe labor is a service and not a natural resource. We believe an environmental impact statement should treat commitments of natural resources, rather than services.

4. Coordination with Other Agencies -

No comment.

The preliminary draft of this environmental impact statement is comprehensive and well written. Other than the few foregoing comments, we concur in your analysis of project effects on local environmental qualities.

Sincerely,



John R. Langenbach
Acting Regional Director

cc: Illinois Department of Conservation
Missouri Department of Conservation

THE STATE



OF MISSOURI

Water Resources Board

Department of Business and Administration
JEFFERSON CITY, MISSOURI 65101

April 16, 1971

Colonel Carroll N. LeTellier
District Engineer
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

Attached are comments received from the several state agencies concerned with the environment as it might be affected by proposed improvements to Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois. In addition to these comments, the Water Pollution Board has advised that the preliminary draft of the Environmental Statement is in their judgment considered adequate.

Your attention is called to the comment presented by the Department of Conservation and relating to the improvement of the quality of man's environment (Item D, page 4). I would suggest that the improvements will improve man's capability to utilize his environment.

In regard to the comment of the Department relating to more efficient use of the 3,430 acres, it is our opinion that they do not realize that attempts are being made to double crop this acreage annually. We are in agreement with your interpretation that the proposed improvements will not materially change the areas existing ecosystem which is the result of present use.

I trust the comments afforded by Missouri state agencies will assist in preparation of the final environmental impact statement.

Sincerely,

A handwritten signature in cursive script that reads "Clifford L. Summers".

Clifford L. Summers
Executive Director

MISSOURI DEPARTMENT OF CONSERVATION

2901 North Ten Mile Drive - Jefferson City, Missouri 65101

P. O. Box 180 - Telephone 314 893-2626

CARL R. NOREN, Director

April 6, 1971

Mr. Clifford L. Summers, Executive Director
Missouri Water Resources Board
P. O. Box 271
Jefferson City, Missouri 65101

Dear Mr. Summers:

We have reviewed the environmental impact statement for the Perry County Drainage and Levee District Numbers 1, 2, and 3 prepared by the St. Louis District Corps of Engineers. The impact statement, in general, is well written. However, there are several points which we believe have been ignored or de-emphasized.

We do not agree that as stated on page 3, item a "The overall environmental effect of this project on the area's natural systems will be negligible..." In our opinion, 3,430 acres of land that will be more effectively farmed is not negligible, nor is the probable loss of the last 280 acres of woodland.

Item b of page 2 identifies two adverse environmental effects, the conversion to cropland of 280 acres of woodlands and the clearing and enlarging of the drainage ditches. The land conversion may be incidental to the project, but it will be a direct result of the project as will the loss of habitat along the drainage ditches. Wildlife habitat should be planted along the cleaned out ditches to hasten their recovery.

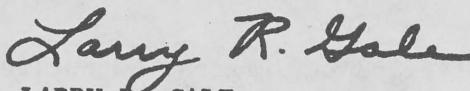
By relieving the farmers from periodic inundations, there will be a local benefit to the farm economy. However, we cannot agree with the sweeping statement in item d that this will "improve the quality of man's environment". The statement should be "improve man's economic return". This project will do little to improve the environment for bird watchers and hunters.

The paragraph dealing with irreversible and irretrievable commitments should include a discussion of the 3,430 acres which are periodically flooded and provide good habitat for game, songbirds, and possibly shorebirds.

Our information indicates that there is some good wildlife habitat adjacent to Cinque Hommes Creek. This area and the areas adjacent to the proposed pump stations could be utilized for wildlife habitat improvement. These areas could offset most of the detrimental effects the project will have on wildlife resources.

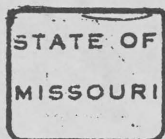
We hope these comments will be of value to you in your review of this environmental impact statement.

Sincerely,

A handwritten signature in cursive script that reads "Larry R. Gale".

LARRY R. GALE
ASSOCIATE DIRECTOR

cc: Bureau of Sport Fisheries and Wildlife
Twin Cities, Minnesota



DIVISION OF GEOLOGICAL SURVEY AND WATER RESOURCES

BUEHLER PARK

ROLLA MISSOURI 65401

314-364-1752

WILLIAM C. HAYES STATE GEOLOGIST AND DIRECTOR

WALLACE B. HOWE ASSISTANT STATE GEOLOGIST

March 10, 1971

Mr. Clifford L. Summers
Executive Director
Missouri Water Resources Board
P. O. Box 271
Jefferson City, Missouri 65101

Re: Summers' memorandum of 25 February 1971, pertaining to review of environmental statement for Perry County drainage and levee districts numbers 1, 2 and 3, Missouri and Illinois.

Dear Mr. Summers:

We have examined the preliminary draft environmental statement for the Perry County drainage and levee districts and we have no comments to make from a geological viewpoint.

Very truly yours,

Jerry D. Vineyard
Chairman
Survey Environmental Geology Group

THE DIVISION OF HEALTH OF MISSOURI
OF THE DEPARTMENT OF PUBLIC HEALTH AND WELFARE
JEFFERSON CITY, MISSOURI 65101

March 10, 1971

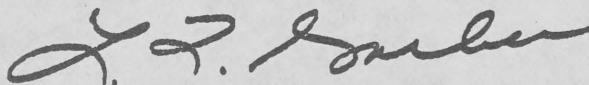
Mr. Clifford L. Summers
Executive Director
Missouri Water Resources Board
P. O. Box 271
Jefferson City, Missouri 65101

Dear Mr. Summers:

This is in response to your memorandum relative to the Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois. The environmental impact, as related to the Division of Health area of responsibility, includes the following:

1. In the construction of the levees, shallow water areas and the associated aquatic vegetation could result in increased mosquito production. Also, if undrained shallow barrow areas are allowed to remain, they will provide breeding places for mosquitoes.
2. Construction could result in increased turbidity in the river water, affecting downstream water users. A detailed map is not included to show the location of the levee to determine if this problem will occur.
3. The construction of the pumping stations, resulting in discharges, could result in concentration of waste. A determination should be made to insure that waste discharges are not allowed to concentrate at sufficient levels to create a problem in the river.

Very truly yours,



L. F. Garber
Director
Section of Environmental Health



MISSOURI STATE PARK BOARD

P.O. BOX 176 • 1204 JEFFERSON BLDG. • JEFFERSON CITY, MO. 65101 • 314/635-9156

March 10, 1971

Mr. Clifford L. Summers
Executive Director
Missouri Water Resources Board
308 East High Street
301 Dawson Building, Box 271
Jefferson City, Missouri 65101

Re: Review of Environmental Statement for Perry County
Drainage and Levee Districts

Dear Mr. Summers:

The Missouri State Park Board has no objections to the environmental statement dated February 1, 1971, prepared by U. S. Army Engineer District, St. Louis, Missouri, pertaining to the subject project.

Sincerely yours,

MISSOURI STATE PARK BOARD

A handwritten signature in cursive script, appearing to read "Ken Otke".

Ken Otke
Assistant Director
Development Division

KO:dl

cc: Mr. Joseph Jaeger, Jr.
Mr. Matt Matheney
Mr. Hadley Irwin

RICHARD B. OGILVIE
Governor



RAY C. DICKERSON
Director

STATE OF ILLINOIS
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

April 7, 1971

Colonel Carroll N. LeTellier
District Engineer
St. Louis District
Corps of Engineers
Department of the Army
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

Reference is made to your letter of February 22, 1971, File LMSED-BR, in which you requested comment on your draft Environmental Statement on Flood Control Project Perry County Drainage and Levee Districts No.'s 1, 2, and 3, Missouri and Illinois.

The Illinois Natural Resource Development Board has reviewed the Statement and has no adverse comment to make.

Sincerely,

A handwritten signature in cursive script that reads "Ray C. Dickerson".

Ray C. Dickerson

CORRESPONDENCE RECEIVED FROM
INTERESTED STATE AND FEDERAL AGENCIES
CONSULTED DURING DEPARTMENTAL REVIEW
OF THE DRAFT ENVIRONMENTAL STATEMENT



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

5 April 1972

Dear General Clarke:

This is in reply to your letter of October 26, 1971, requesting our views and comments on the proposed report on the Perry County Drainage and Levee Districts Numbers 1, 2 and 3. We have completed our review of the report and related information and submit the following comments for your consideration and use.

The proposed report does not recommend any recreation development. As the project does not afford much opportunity for any significant recreation development, we concur with the plan as formulated. The proposed plan does not impact on any Indian lands under our jurisdiction.

We are pleased to note your plans for developing a program emphasizing the establishment and preservation of wildlife cover as part of the maintenance of this project. We further understand that you plan to develop and present this program to the Levee District Commissioners during the pre-construction phase of planning. While the program has the full support of this Department, we would prefer to see it made an integral part of the plan of development which is to be submitted to Congress for approval. Federal participation in the overall plan would then be contingent upon the implementation of all components, including the wildlife program. Hence, we urge you to modify your recommendation for this plan of development so that the wildlife program will become an integral part of the overall project.

We have reviewed the draft environmental statement for this project and submit the following comments as to the adequacy of this statement in covering environmental considerations.

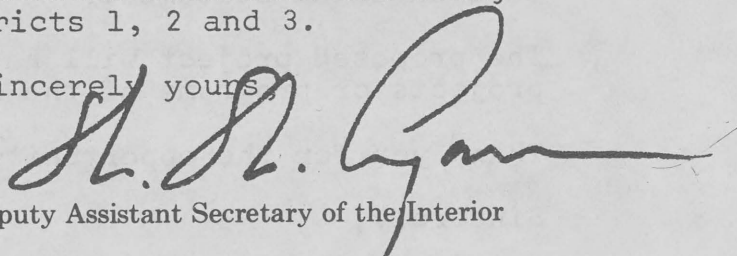
The draft statement recognizes that no existing or proposed units of the National Park System or sites eligible or potentially eligible for registration as natural, historic or environmental education landmarks would be adversely affected by this project. The statement also indicates that the State Liaison Officer was consulted and the project does not impinge on any areas listed in the National Register of Historic Places. However, the final statement should clearly document the steps taken to comply with Section 106 of the National Historic Preservation Act of 1966 (PL 89-665). Also, a copy of the comments of the State Liaison Officer for Historic Preservation for the State of Missouri concerning the negative effects of the undertaking upon historic or archeological resources which may be in the process of nomination to the National Register should be included.

The final statement should indicate whether or not any Federally owned or controlled lands would be affected by the proposed action and identify any necessary steps taken to comply with Executive Order 11593, Protection and Enhancement of the Cultural Environment.

We note the draft statement recognizes that the archeological aspects of the project area are not well known and that scattered archeological sites are known to exist in Perry County, Missouri. Recent communication between the National Park Service Midwest Archeological Center and the University of Missouri indicates the probability of archeological sites in the project area. An archeological survey should be conducted to (1) determine the significance and extent of archeological values; (2) provide a basis for evaluating these impacts in terms of the five points set forth in Section 102(2)(C) of NEPA; and (3) define any archeological salvage program needed to mitigate losses to the cultural environment.

We wish to thank you for the opportunity to review your plan of development and environmental statement for Perry County Drainage and Levee Districts 1, 2 and 3.

Sincerely yours,



Deputy Assistant Secretary of the Interior

Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Attn: DAEN-CWP-D
Washington, D.C. 20314



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

February 4, 1972.

Honorable Robert F. Froehlke
Secretary of the Army

Dear Mr. Secretary:

This is in reply to the Chief of Engineers letter of October 26, 1971, transmitting for our review and comment his proposed report and pertinent papers, including the environmental statement, on Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri.

The proposed project consists of the construction of four pumping stations and two new drainage ditches. The proposed improvement is designed to provide relief from interior flooding on agricultural lands.

The project is recommended as a means of increasing agricultural production and local farm income. The report would be strengthened if it presented the current level of farm income and expected increase in farm income with the proposed project.

The report indicates that about 280 acres of woodland within the districts could be converted to cropland as a result of improved drainage. The report does not contain specific data on forest resource values that would be lost if the project is constructed. We believe that such values should be considered and accounted for in project cost determination.

Enclosed are additional comments regarding the draft environmental statement.

The proposed project will have no adverse effects on projects or programs of the Department of Agriculture.

Thank you for the opportunity to review this material.

Sincerely,

A handwritten signature in cursive script, reading "T. K. Cowden", is written over the typed name.

T. K. COWDEN
Assistant Secretary

Additional Comments on Draft Environmental Statement

Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri

The associated environmental impact statement would benefit from the following revision:

Footnote 1, page 2, is both misleading and inconsistent with the projections report that is cited. The projections indicate that it is not necessary to cultivate diverted land intensively in order to obtain the projected agricultural outputs. The report cited specifically projects a decrease in the acreage of total cropland harvested and used for pasture from 1959 through 2020. Even though the projected production in 2020 is more than double that of 1959-61, this increase is more than offset by the increase in projected agricultural productivity. Our specific recommendation is to omit the entire footnote, and to adjust the text, beginning at the bottom of page 1, to read: "Currently about 97 percent of the land in the district is either devoted to agricultural production, principally cash grains (soybeans, corn and wheat) and alfalfa, or diverted from production under current agricultural programs. About 1 percent . . .".

In the section describing alternatives, the alternatives of flood insurance and zoning management mentioned in the main body of the project report should be presented along with an estimate of their comparative environmental effects. As it stands, this section's wording implies that the only alternative to the proposed project is to do nothing, a course that is predicted to result in local wasted labor and psychological stress.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE - ROOM 249
KANSAS CITY, MISSOURI - 64108



IN REPLY REFER TO: AWPR-PLAN

December 30, 1971

Lieutenant General F.J. Clarke
Chief of Engineers
Department of the Army
Washington, D.C. 20314

Dear General Clarke:


Your letter of October 26, 1971, to Mr. William D. Ruckelshaus requesting our comments on Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri has been referred to this office.

In connection with the Survey Report for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3, we conclude that the proposed works of improvement will not have any significant adverse effect on water quality enhancement.

The draft Environmental Impact Statement appears to be a thorough and objective response to Section 102 (2) (c) of the National Environmental Policy Act of 1969.

We appreciate the opportunity to review and comment on these documents. Please provide us with a copy of the final Environmental Impact Statement as submitted to the President's Council on Environmental Quality.

Very truly yours,


CHARLES H. HAJINIAN
Chief, Program
Planning Branch



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON, D.C. 20201

OFFICE OF THE SECRETARY

March 20, 1972

F. J. Clarke
Lieutenant General, USA
Chief of Engineers
Washington, D. C. 20314

Dear Lt. Gen. Clarke:

Secretary Richardson has asked me to respond to your letter of October 26, 1971, wherein you requested comments on the draft environmental impact statement for Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri.

This Department has reviewed the health aspects of the above project as presented in the documents submitted. This project does not appear to represent a hazard to public health and safety.

The opportunity to review this draft environmental impact statement is appreciated.

Sincerely yours,

Merlin K. DuVal, M.D.
Assistant Secretary for
Health and Scientific Affairs

cc: Cong. Bill D. Burlison



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (WS/83)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: 426-2262

SA 0714

December 23, 1971

Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Clarke:

This is in response to your letter of 26 October 1971 addressed to Secretary Volpe concerning the flood control project for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Perry and Randolph Counties, Missouri and Illinois respectively.

The concerned operating administrations and staff of the Department of Transportation have reviewed both the environmental impact statement and survey report and other than to recommend and concur with the project, this Department has no comments to make.

The opportunity for this Department to review the draft statement and survey report for the Perry County Drainage and Levee Districts Nos. 1, 2 and 3 is appreciated.

Sincerely,

W. M. BENKERT
Rear Admiral, U.S. Coast Guard
Chief, Office of Marine Environment
and Systems

RICHARD B. OGILVIE
Governor



RAY C. DICKERSON
Director

STATE OF ILLINOIS
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

March 15, 1972

Lieutenant Colonel Leon E. McKinney
Assistant Director of Civil Works
for Mississippi Valley
Office of the Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear Colonel McKinney:

Reference is made to your letter of February 25, 1972, File DAEN-CWP-D, requesting State comment on the proposed report of the Chief of Engineers with accompanying papers, on Perry County Drainage and Levee Districts Nos. 1, 2 and 3, Missouri. The Illinois Natural Resource Development Board has reviewed both the report and the environmental impact statement thereon and has no adverse comment to make in regard to either.

Sincerely,

A handwritten signature in cursive script that reads "Ray C. Dickerson".
Ray C. Dickerson



Warren E. Hearnes
Governor

Executive Office
Jefferson City
Missouri

January 13, 1972

Lieutenant General F. J. Clarke
Chief of Engineers
Office of the Chief of Engineers
Washington, D. C. 20314

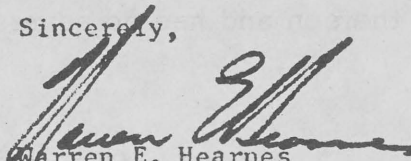
Dear General Clarke:

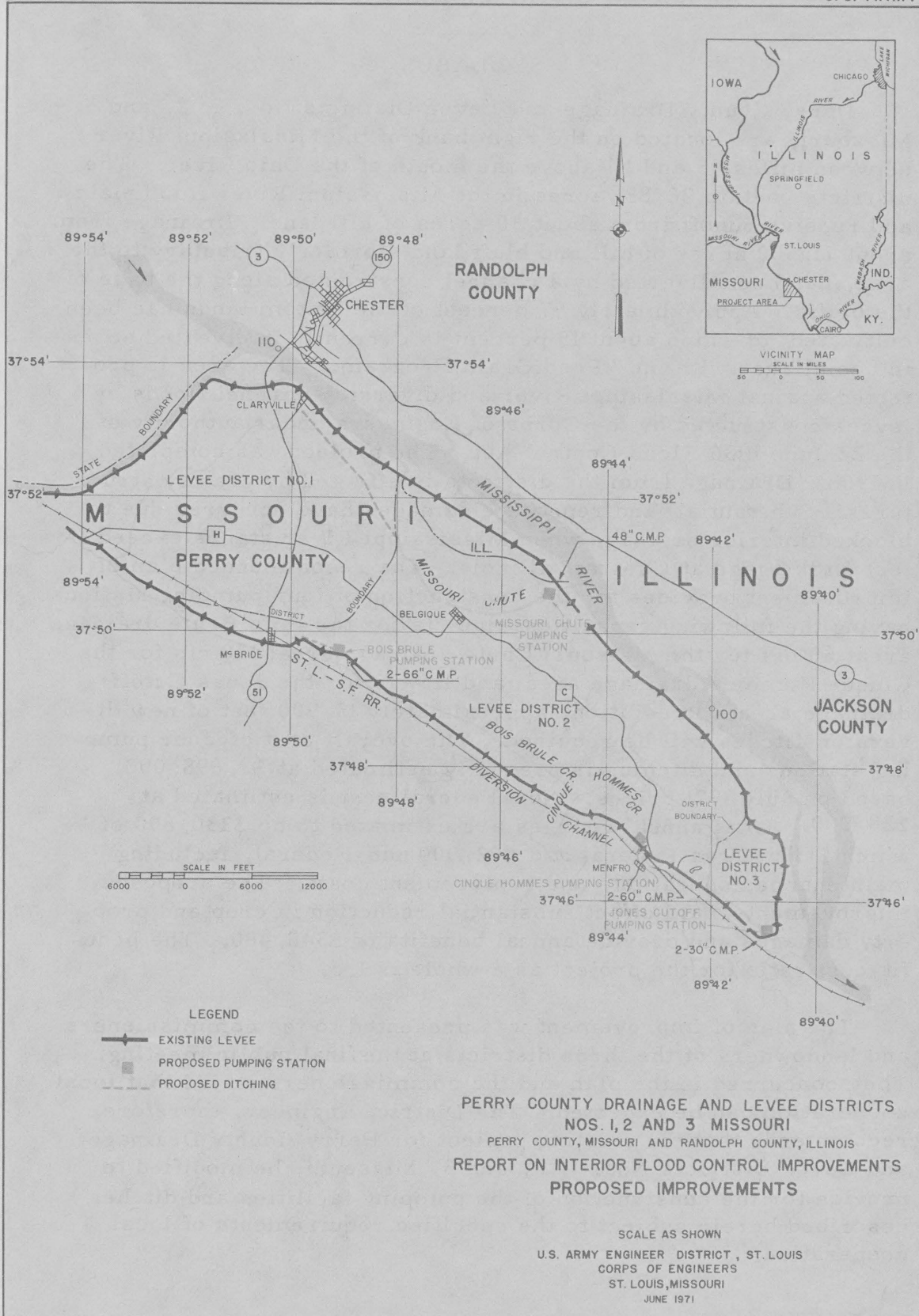
Your Survey Report on Perry County Drainage and
Levee Districts Nos. 1, 2, and 3, Missouri, has
been received and reviewed by the appropriate
agencies of the State.

This letter is to inform you that I concur in
your recommendations and to farther advise that
I am pleased with your treatment of the environ-
mental factors associated with the project.

I urge early authorization and funding of your
proposal.

Sincerely,


Warren E. Hearnes
Governor



REPORT OF THE DISTRICT ENGINEER

SYLLABUS

Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, are located on the right bank of the Mississippi River between miles 95 and 111 above the mouth of the Ohio River. The districts contain 26,881 acres in the Mississippi River flood plain and receive runoff from about 30 acres of hill land. Drainage from about 71,500 acres of hill and bluff land, formerly tributary to the area, has been diverted by a channel constructed along the base of the bluffs. Approximately 97 percent of the bottom lands has been cultivated, of which about 15 percent is currently in diverted acres in compliance with the "Feed Grain Program." The area is protected against Mississippi River and diversion channel floods by levees constructed by the Corps of Engineers under authority of the 22 June 1936 Flood Control Act. The project was completed in 1968. Drainage from the districts is effected by gravity structures. Substantial and repetitive damages have occurred due to blocked interior drainage when Mississippi River stages exceed 13 feet on the gage at Chester, Illinois. The recommended plan of improvement provides for the construction of four pumping stations having the following capacities: 100 cfs for the Bois Brule drainage area; 60 cfs for the Missouri Chute drainage area; 130 cfs for the Cinque Hommes drainage area; and 115 cfs for the Jones Cutoff drainage area. In addition, approximately 13,900 feet of new diversion ditches will be required. The overall cost of four pumping stations and ditching is presently estimated at \$2,698,000, based on July 1971 prices. Non-Federal cost is estimated at \$28,000. Total annual charges are estimated to be \$230,600 of which \$137,700 is Federal and \$92,900 non-Federal, including maintenance, operation, and replacement costs. The proposed improvement would effect substantial reduction in crop and property damages and provide annual benefits of \$348,400. The benefit-cost ratio for the project as a whole is 1.5.

The plan of improvement was presented to the commissioners and landowners of the three districts at the final public meeting. They concurred in the plan and the commissioners stated that local cooperation can be expected. The District Engineer, therefore, recommends that the existing project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, be modified to provide for the construction of the pumping facilities and ditches described herein subject to the specified requirements of local cooperation.



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

LMS-ED-B

30 June 1971

SUBJECT: Survey Report on Interior Flood Control Improvements -
Perry County Drainage and Levee Districts Nos. 1, 2,
and 3, Missouri

THRU: Division Engineer, Lower Mississippi Valley

TO: Chief of Engineers

SECTION I - AUTHORIZATION AND PURPOSE

1. AUTHORIZATION

The authorization for this report is contained in Section 11 of the Flood Control Act of 1946 (Public Law 526, 79th Congress, 2d Session), approved 24 July 1946. Pertinent excerpts are as follows:

The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys for flood control and allied purposes, including channel and major drainage improvements. . . to be made under the direction of the Chief of Engineers, in drainage areas which include the following-named localities. . .

Mississippi River at and in the vicinity of
Perry County drainage and levee districts
numbered 1, 2, and 3, Missouri.

2. PURPOSE AND EXTENT

The purpose of this report is to determine the engineering and economic feasibility of providing improvements to eliminate or minimize damages caused by interior flooding in Perry County Drainage

and Levee Districts Nos. 1, 2, and 3. Topographic data used in this report were obtained from available field surveys and maps, 1969 aerial photographs, and U.S.G.S. quadrangle sheets supplemented by drainage course profiles and cross-sections. Geologic data were obtained from previous studies for seepage control measures and general published information. Data on present crop distributions, yields, and production costs were obtained through interviews with farmers in the districts and data published by the Soil Conservation Service and the University of Missouri and University of Missouri Extension Services. The District Engineer made a reconnaissance of the area in 1970 and, subsequently, has discussed problems of the area with the district commissioners.

3. PRIOR REPORT

Pursuant to the Flood Control Act of 1946, a Preliminary Examination report on drainage improvements in the three districts was submitted in May 1949. Investigations for the report showed that part of the gravity drainage through the levee is blocked by Mississippi River stages about 37 percent of the time, and that the resulting interior impoundment severely damages crops. It was concluded that a feasible method of alleviating these damages would be the construction of pumping facilities and that preliminary estimates of a plan consisting of three pumping stations indicated that the plan may be economically justified. By letter, dated 14 November 1949, the Chief of Engineers authorized preparation of a survey report.

SECTION II - DESCRIPTION

4. LOCATION

Perry County Drainage and Levee Districts Nos. 1, 2, and 3 are located in Perry County, Missouri, and Randolph County, Illinois, on the right bank of the Mississippi River between river miles 95 and 111 above the mouth of the Ohio River. The districts are bounded on the north by the old Mississippi River channel prior to 1881, by the Mississippi River on the east and south, and by a diversion channel at the base of the bluffs on the west. There are 26,881 acres of bottom lands within the districts which are intensely cultivated and highly productive. Drainage from about 30 acres of hill land is tributary to the upstream end of the districts. The districts are protected by a common levee system. Their general features are shown on PLATES 1 and 2.

5. EXISTING PROJECT

The local flood protection project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, as authorized by the Flood Control Act of 22 June 1936, encompassed the presently protected area, exclusive of Crains and Puckett Islands. The project was modified in 1949 to include 2,550 acres of these islands, of which approximately 844 acres are located on Crains Island in Randolph County, Illinois. As modified, the project provided for raising and enlarging the existing levee system by reconstruction of 7.7 miles of riverfront levee, 14.1 miles of back levee, and four miles of upper flank levee; construction of 7.3 miles of new riverfront levee; and the construction of appurtenant works, consisting of gravity drainage structures, highway closure structures, surfacing of service roads on the levee crown, and altering railroads at levee crossings. The construction work was completed in 1968.

6. TOPOGRAPHY

The area under consideration is approximately 15 miles long and varies in width from about one to four miles. It is interlaced by numerous former channel remnants and the land surfaces are essentially gently undulating successions of ridges and swales. Land generally slopes from the river toward the bluffs. The range in elevation is about 25 feet (355 to 380 feet*). Variations in

* Elevations cited herein refer to mean sea level, Fifth General Adjustment, 1929.

topography normal to the Mississippi River are about half that amount.

7. GEOLOGY AND SOILS

The districts lie in the broad valley of the Lower Mississippi River flood plain. Recent alluvium which has filled the entrenched valley consists of a pervious sand and gravel substratum overlain with fine grained top stratum of clays and silts interspersed with sand. The pervious sand and gravel substratum above the limestone valley floor varies in thickness from about 85 feet to 130 feet. Grading of the substratum varies progressively upward from gravels and coarse sand on the valley floor to very fine sands at the top of the substratum. The top stratum has lateral and vertical discontinuities and in general, varies in thickness from about 10 to 30 feet, with localized narrow areas up to 70 feet. Soils near the valley wall have been modified by colluvial wash from the nearby valley walls and bluffs. The surface geology consists essentially of ridge and swale formations with a few well-defined major channel fill deposits. The valley wall and bluffs consist principally of limestone overlain by glacial till which is overlain by loess. The soils are productive and, except for the more plastic soils adjacent to the valley walls, are easily tilled and lend themselves to intensive cultivation.

8. CLIMATOLOGY

The climate is of the interior-continental type in which large variations in daily, monthly, and seasonal temperatures occur. The National Weather Service does not maintain a first order weather station in the immediate area of the districts; however, there are first order stations at St. Louis, Missouri, approximately 72 air miles northwest and at Cairo, Illinois, approximately 65 air miles southeast. Data for the St. Louis station shows that the mean monthly temperature ranges from 31.8 degrees in January to 79.4 degrees in July. Daily extremes of minus 23 degrees in 1864 and 115 degrees in July 1954 were experienced. The mean annual precipitation is 36.68 inches, with a maximum of 68.83 inches in 1858, and a minimum of 20.59 inches in 1953. The mean annual precipitation for the second order station at Chester, Illinois, (approximately five miles from the center of the districts) is 38.0 inches, and for Cairo, Illinois, 45.23 inches. Snowfall at St. Louis averages 17.2 inches annually with the maximum occurrence of 20.4 inches on 30-31 March 1890. The heaviest rains occur during June, July, and August and have ranged from 0.60 to 14.54 inches for 5-minute and 3-day durations, respectively. The mean St. Louis data are based upon

records at Lambert Field, St. Louis, and the extremes include data for the previous St. Louis station located in downtown St. Louis.

9. ECONOMIC DEVELOPMENT

Approximately 82 percent of the land in the districts is currently cultivated. In addition, about 15 percent of the land that was previously cultivated is in diverted acres in compliance with the "Feed Grain Program". The remaining three percent is in farm-sets, towns, industries, roads, a railroad, ditches, and a small amount of non-use land. Crops grown are corn, soybeans, wheat, and alfalfa hay. The value of production is estimated to be about \$2,500,000 annually. The districts have a population of about 350 persons, including the town populations of McBride (80), Claryville (30), and Belgique (61). The usual types of commercial establishments incidental to an agricultural area are found in these towns. There are two alfalfa dehydration mills, one near the Perryville Municipal Airport, located about two miles north of McBride, and the other, immediately adjacent to the area in the town of Menfro. Beldex Corporation employs between 80 and 140 persons at the aforementioned airport in jet aircraft engine repair. Laminated Plastics Company at McBride, with 15 employees, manufactures wall panelling. The main line of the St. Louis-San Francisco Railway parallels the bluffs and the back levee of the three districts, being inside the levee from the upstream end of the districts to McBride and outside of the levee from that point to the downstream end of the districts. Missouri State Highway 51 traverses the area from McBride to Claryville, connecting with Illinois highways via the Chester Bridge. Missouri State supplementary roads, C, E, H, and M traverse and terminate in the area. A 20-inch crude oil pipeline of the Mobil Pipeline Company crosses the northern part of the area. Water transportation is available, but there are no water terminal facilities on the Mississippi River adjacent to the districts.

10. ENVIRONMENTAL ASPECTS

All but about 280 acres which are in woodland and idle scrubland are in agricultural and associated use. Principal tree species are cottonwood, willow, and maple, which are concentrated in several small woodlots scattered throughout the area. Principal wildlife species include bobwhite quail, cottontail rabbits, raccoons, tree squirrels, and a variety of song birds. Wildlife populations in this area are largely dependent upon the woodland resources for food and cover. This area does not provide important habitat for any endangered species.

11. EXISTING DRAINAGE

Early in the 1900's, local interests constructed the 15.5 mile long diversion channel along the base of the bluffs, collecting runoff from about 71,500 acres of hill and bluff land that formerly crossed the bottoms and diverted it to the Mississippi River at the downstream end of the districts. Due to the predominance of ridge and swale formations of the land surface, natural drainage is generally good. Approximately 92.7 percent of the land is drained by the four major drainage channels called Ditch A, Cinque Hommes Creek, Jones Cutoff, and Missouri Chute. A detailed description of these ditches is given in APPENDIX A. The main ditches generally follow the former winding creek courses across the bottoms and are fed by numerous tributary ditches or natural swales. During construction of the back levee along the diversion channel, borrow material for the levee was obtained from landside borrow pits located about 100 feet from the landside toe of the levee and varying in width from 100 to 400 feet. While these pits are not continuous and contain cross-ties of unexcavated ground or "traverses" left for access purposes, these pits provide collector and conveyance channels for runoff to gravity drainage structures. There are 16 gravity drainage outlets through the levee, three of which drain into the Mississippi River with the remaining 13 draining into the diversion channel. These drains vary in size from an 18-inch to a double, 66-inch structure. Their locations are shown on PLATE 1 and pertinent features are listed in TABLE A-1 of APPENDIX A. Drainage areas for the ditch systems are as follows:

<u>Drainage System</u>	<u>Drainage Area-Acres</u>
Ditch A	10,608*
Missouri Chute	3,514
Cinque Hommes Creek	8,687
Jones Cutoff	2,052
Six drainage areas not included in above four systems	<u>2,050</u>
Total drainage area	26,911

* Includes 30 acres of hill land drainage.

12. RUNOFF AND STREAM FLOW DATA

There are no stream gaging stations within the drainage area of the districts, nor are there any stations in similar type areas in the region from which flow indications may be obtained. Characteristics of flow impoundment have been synthesized for the period 1913-1969, inclusive, from estimates of daily runoff from rainfall minus discharge through the gravity drainage outlets during non-blocked gravity drainage times and from estimates of runoff from rainfall and seepage during times of blocked gravity drainage occurrences. River stages at the drainage outlets were developed from recorded daily discharges for the Mississippi River at St. Louis, transposed to the location of the drainage outlets, and adjusted to reflect present channel conditions. Estimates of runoff from rainfall were derived by reducing daily rainfall amounts recorded for the National Weather Service Station at Chester, Illinois, by estimated infiltration rates. The Chester Station is located across the Mississippi River from the upper end of the districts. Estimates of seepage were developed from stage-volume of seepage inflow relationships. Estimates of impounded runoff indicated the areal extent of flooding to be expected.

13. MAPS AND AERIAL PHOTOGRAPHS

In addition to the maps of the districts, Plates 1 and 2, the following pertinent maps and aerial photographs are available.

- a. United States Geological Survey topographic maps to a scale of 1:62,000 and 1:24,000 with contour intervals of 20 feet. The latter has five-foot contour intervals in the Mississippi River bottoms.
- b. Map of the flood plain of the Mississippi River between the mouths of the Ohio and Missouri Rivers, scale of 1:24,000, contour interval, five feet, prepared by the U. S. Army Engineer District, St. Louis, in 1940.
- c. Two sets of aerial photographs on file in the U. S. Army District, St. Louis, scale of approximately 1" = 2,000 feet, flown in May 1969 and July 1969. Photographs for Plate 2 are from the latter set. Both flights were at times when Mississippi River stages were sufficiently high to block outflow from the major outlets.
- d. Air-photo maps of Mississippi River levees, St. Louis District, Alton to Gale, Illinois, scale of 1" = 2,000 feet, prepared by the Waterways Experiment Station in cooperation with the U.S. Army Engineer District, St. Louis, in 1955.

SECTION III - PROBLEMS UNDER INVESTIGATION

14. DESIRES OF LOCAL INTERESTS

a. Initial public hearing. A public hearing was held at McBride, Missouri, on 17 September 1948 by the District Engineer, St. Louis. The meeting was attended by about 90 persons representing various civic, Federal, and State agencies, and landowners in the affected area. Statements made at the public hearing by local interests indicated that the present drainage system which depends on gravity drainage structures through the levees is not adequate. Crop damage was stated by local interests to begin when the present gravity drainage structures were closed by reason of Mississippi River stages. It was generally stated that the damage to crops amounted to well over one million dollars in 1947 as a result of blocked drainage. It was the general opinion that additional gravity drainage alone would not alleviate the damages now suffered and that pumping facilities would be required. Opinions were expressed that necessary local cooperation would be forthcoming for any improvements which may be recommended. A complete record of the public hearing is on file in the St. Louis District office.

b. Additional contacts. The desires of local interests for relief from damages caused by impoundment of interior runoff are well known. Since the scope and extent of the problem have been repeatedly discussed with local interests during the levee commissioners' visits to the District office, annual meetings with the commissioners, inspection trips, flood fight activities, and post-flood damage surveys, no intermediate public meeting has been held subsequent to the initial meeting. Considered plans of improvement were discussed with the commissioners during the study effort.

15. EXISTING PROBLEM

While a substantial degree of protection against direct flooding by the Mississippi River has been provided to the districts from the levee project, the problem of disposal of impounded interior runoff remains. The most extensive flooding occurs when runoff, whether from rainfall, seepage, or a combination thereof, is blocked by Mississippi River stages. Short duration impoundment is occasionally experienced at times of low river stages when runoff from intense rainfall exceeds the capacity in the vicinity of the outlet structures and spreads to areas adjacent to the drainage channels. Under extreme flood conditions, about 46 percent of the land in the districts is subject to flooding.

16. MISSISSIPPI RIVER STAGE CHARACTERISTICS

Stage variations of the Mississippi River in the vicinity of the districts is about 44 feet. Maximum stages at gages at Chester, Illinois, (river mile 109.5) and Red Rock Landing, Missouri, (river mile 94.1) located near the upstream and downstream limits of the districts, occurred in 1844 and were 39.8 and 44.5 feet, respectively. Minimum stages occurred in 1964 and were -4.3 and -0.5 feet, respectively. Under present channel conditions, the 1844 flood would attain stages of 49.7 and 55.7 feet, respectively. The relationship between stages and discharges in the reach of Mississippi River under condition has changed considerably during the 57-year period of record, 1913-1969, inclusive, analyzed in this investigation. This is attributable principally to the installation of channel stabilization works for navigation and the confinement of overbank discharges by levees for flood protection. Since planned modifications or additions to these works will not significantly alter the stage-discharge relationship developed from data for the 1947-1951 period, that relationship is considered to be representative of present and future channel conditions. It is also considered that discharges experienced during the 1913-1969 period are indicative of those to be expected in the future. Stages corresponding to the discharges, adjusted to 1947-1951 channel conditions, show that gravity drainage would be blocked at the Cinque Hommes and Jones Cutoff outlets in 53 of the 57 years analyzed. Those outlets have the lowest gate closing stages of all the outlets in the districts, equivalent to 13 feet on the Chester gage. This blockage normally occurs during the cropping season and ranges from a few days to 148 days and averages 91 days per year. Data on the maximum annual blockage periods for Jones Cutoff are given in TABLE A-9, APPENDIX A, HYDROLOGY AND HYDRAULICS.

17. FLOOD DAMAGES

During the 57-year period studied, flooding occurred every year. The maximum flooding occurred in 1915 and inundated 12,251 acres. Damages have been chiefly to crops, although some farm properties are occasionally damaged. Average annual damages under present (1970) conditions of development are estimated to be \$300,900 to crops and \$7,500 to property, totaling \$308,400. The procedures for estimating damages are given in APPENDIX B, DAMAGES AND BENEFITS. For the purposes of assigning these damages, the six minor drainage areas referred to in paragraph 10 were combined with the four major drainage areas as shown in TABLE A-3, APPENDIX A, HYDROLOGY AND HYDRAULICS. The modified Ditch A area, containing 10,799 acres, is named Bois Brule after the local name for the area. Cinque Hommes drainage area is

unchanged with 8,687 acres. The modified Missouri Chute and Jones Cutoff drainage areas are 3,570 and 3,855 acres, respectively. Estimates of damage under existing conditions of development in these four areas are given in the following subparagraphs.

a. Bois Brule area. The maximum area flooded is estimated to be 3,236 acres. Approximately 1,786 acres are flooded annually. Resulting average annual damages to crops are estimated at \$102,000 and to property \$2,300, totaling \$104,300.

b. Missouri Chute area. Maximum inundation amounts to 1,942 acres. The average annual number of acres flooded is 1,443 acres. The estimated average annual damages are \$63,200 to crops and \$1,900 to property, totaling \$65,100.

c. Cinque Hommes area. The maximum inundation is 4,494 acres with 1,732 acres being flooded annually. The average annual damages are estimated to be \$92,800 to crops, \$2,200 to property, and \$95,000 total damage.

d. Jones Cutoff area. The maximum inundation is 2,579 acres. An average of 888 acres are estimated to be flooded annually. The estimated average annual damages are \$42,900 to crops and \$1,100 to property, totaling \$44,000.

18. OWNERSHIPS AFFECTED BY FLOODING

Exclusive of small residential lots in the villages of McBride, Belgique, and Claryville, there are 217 landowners in the districts. Tracts are generally small, the largest being 327 acres. It is not uncommon for the larger landowners to have holdings throughout the three districts. Holdings of individual landowners range in size from a few acres to 494, 499, and 2,165 acres with the latter consisting of 16 widely separated tracts. Of the total ownerships, 154 contain lands subject to flood damage, including 140, 377, and 1,461 acres, respectively, for the three largest ownerships.

SECTION IV - PROPOSED SOLUTIONS AND PROJECT FORMULATION

19. SOLUTIONS CONSIDERED

Plans considered for alleviating damages within Perry County Drainage and Levee Districts Nos. 1, 2, and 3 caused by impoundment of interior runoff consist of a barrier dam and pumping station; pumping stations supplemented by increased capacities for the existing gravity drainage outlets; and nonstructural measures.

a. Barrier Dam Plan. This plan contemplates the construction of a barrier dam across the outlet of the bluffline diversion channel. The diversion channel would convey runoff from the Bois Brule, Cinque Hommes, and Jones Cutoff areas which constitute 87 percent of the drainage area of the districts and from the 71,500 acres of bluffland tributary to the diversion channel to the Mississippi River through a gated passage in the dam during periods of low Mississippi River stage. During high river stage periods, the gates would be closed and runoff would be pumped over the dam. Under this plan, a separate pumping station would be required for the Missouri Chute area. Reservoir storage would be experienced in the diversion channel during conditions of high river stage and heavy interior and hill-side runoff. Consequently, a reduction in benefits, particularly in the Jones Cutoff and Cinque Hommes areas, over those creditable to other plans, could anticipated. The alternative would be to provide sufficient pump capacity to eliminate any significant reservoir storage. Based on the foregoing, the barrier dam plan was considered impractical and unduly costly and was not given further investigation.

b. All Pumping Station Plan. Alternative methods of resolving the interior flood problem by pumping led to consideration of four basic plans consisting of one, two, three, and four pumping stations with associated diversion ditching. The one station plan minimized pumping plant costs with diversion of all runoff to it. The pumping plant costs progressively increased in the two, three, and four station plans but the diversion ditch excavation costs decreased. The one and two station plans would require diversion of runoff from the Missouri Chute area across the districts.

c. Increase in gravity drainage outlet capacity. A preliminary analysis was made of the feasibility of providing additional gravity drainage outlet capacity at the proposed pumping station sites. Future conditions of internal development were assumed. Results indicated that the increases in capacity of the outlets lacked economic justification.

d. Nonstructural solutions. The application of flood plain regulation and flood insurance were investigated. The study area is now and is projected to remain in agriculture. Means of reducing damages by regulation would be to develop a plan to evacuate the areas subject to flooding, develop and plant crops more resistant to short period inundation, or grow crops whose plant-to-harvest season avoids the usual flood periods. Local interests advise that evacuation would be wholly unacceptable. Based upon present knowledge of technological advances in the seed, fertilizer, and insecticides, development of flood resistant or non-flood season crops does not appear to be practicable at this time. A program to provide flood insurance against losses over the full frequency range of interior flooding is considered to be impractical because some degree of such flooding occurs annually. An insurance program confined to the high and possibly to the moderately high frequency floods would be equally impractical as a means of reducing flood losses. An insurance program, at any level, would require that annual premiums be based upon a measure of the average annual damages from floods increased by a contingency factor to allow for the event of any of several possible rarer frequency flood occurrences in the immediate future rather than in a uniform series, plus a service charge and profit for the insurers. Because of its apparent high cost, flood insurance was not considered further.

20. PROJECT FORMULATION

The most feasible and practical means of alleviating the interior flood problem in Perry County Drainage and Levee Districts Nos. 1, 2, and 3 is the installation of pumping stations. The one-station plan considered a plant at the Cinque Hommes gravity drainage outlet with diversion of runoff from all other drainage areas to it. The two-station plan considered sites at the Bois Brule and Cinque Hommes gravity drainage outlets that would require diversion of runoff from 28 percent of the districts' drainage area. The three-station plan included a pumping plant site at the Missouri Chute gravity drainage outlet in addition to those in the two-station plan. The four-station plan contained an additional plant at the Jones Cutoff gravity drainage outlet. Preliminary analysis showed the four-station plan to be the most practical, and was the basis for selection for detailed analysis. The detailed analysis produced optimum pump capacities that varied from those selected for the preliminary analysis. However, a cost reanalysis, based upon the optimum pump capacities and their station costs, verified the initial conclusion that the four-station plan was the most economical. The costs for the three-station plan were found to be

slightly higher than that plan for the four-station plan. The alternative plans of improvement were discussed with the commissioners of the three districts who expressed a strong desire for the four-station plan.

a. Pumps. The pumping facilities are designed to function as syphons. The capacity of each pumping station was developed by analyzing the annual costs and benefits for an array of capacities and associated diversion ditching and selecting that capacity for which the net tangible benefits were maximized. The larger capacities analyzed required the inclusion of costs for enlargement of the main ditch systems to assure that they were of sufficient capacity to satisfy the pump capacity requirements. Details of this analysis are presented in APPENDIX B, DAMAGES AND BENEFITS. The locations of the pumping stations are shown on PLATES 1 and 2, and a typical schematic plan of the stations is shown on PLATE 3. Operational characteristics of the proposed pumping plants are as follows:

(1) Bois Brule pumping station. This station would be located near the double, 66-inch gravity drainage outlet structure for Ditch A. Costs and benefits were developed for four sizes of pumps whose capacities ranged from the equivalent average removal rates of between 0.20 and 0.75 inch of runoff from the drainage area in 24 hours. The greatest excess of benefits over costs for this station occurred for a 100 cfs capacity. This pump capacity would reduce the maximum area flooded from 3,236 acres at elevation 365.8 to 2,549 acres at elevation 365.0, and the average annual acres flooded from 1,786 to 1,047 acres. A pumping station with an installed capacity of 100 cfs would be capable of removing about 0.22 inch of runoff in 24 hours from its drainage area. The maximum static head against which the facilities would operate is 22.0 feet.

(2) Missouri Chute pumping station. This station would be located in the vicinity of the 48-inch gravity drainage outlet structure at the mouth of Missouri Chute. By analyzing costs and benefits for four pump capacities ranging from the equivalent average removal rates of between 0.20 and 0.75 inch of runoff from the drainage area in 24 hours, it was determined that a 60 cfs pump would provide the maximum excess of benefits over costs. This size plant would reduce the maximum area flooded from 1,942 acres at elevation 371.8 to 1,832 acres at elevation 370.9 and the average annual acres flooded from 1,443 to 641 acres. The facility would be capable of removing 0.40 inch of runoff in 24 hours from its drainage area. The maximum static head against which it would operate is 26.5 feet.

(3) Cinque Hommes pumping station. This station would be located near the double 60-inch gravity drainage outlet structure for Cinque Hommes Creek between the outlet structure and Highway C. Annual costs and benefits developed for four pump capacities ranging from the equivalent average removal rates of between 0.08 and 0.75 inch of runoff in 24 hours from the drainage area showed that a 130 cfs pump would provide the maximum excess of benefits over costs. This capacity plant would reduce the maximum area flooded from 4,494 acres at elevation 363.6 to 2,178 acres at elevation 361.2. The average annual acres would be reduced from 1,732 to 499 acres. A pumping station with an installed capacity of 130 cfs would be capable of removing about 0.36 inch of runoff in 24 hours from its drainage area. The maximum operational static head is 32.5 feet.

(4) Jones Cutoff pumping station. The Jones Cutoff pumping station would be located in the vicinity of the two 30-inch gravity drainage outlet structures installed at the most downstream end of the districts. An alternate site at the 42-inch gravity drainage outlet located about 6,000 feet upstream would serve equally as well. The two outlet structures are connected by a landside borrow pit; the outlet invert elevation of the 42-inch and one of the 30-inch structures are the same. The views of the commissioners of Perry County Levee District No. 3 were requested concerning the most desirable location. They reported that a canvass of essentially all landowners in the district showed that they were unanimously in favor of the 30-inch outlet location because they felt that location would best service the downstream portions of the districts. Analysis of four pump capacities ranging from the equivalent average removal rates of between 0.35 and 1.00 inch of runoff in 24 hours from the drainage area showed that a 115 cfs pump would provide the maximum excess of benefits over costs. A plant of this capacity would reduce the maximum area flooded from 2,579 acres at elevation 364.4 to 556 acres at elevation 356.3 and the average annual acres flooded from 888 to 234 acres. The plant would be capable of removing 0.71 inch of runoff from its drainage area in 24 hours. The maximum static head against which it would operate is 29.0 feet.

(5) Coincident pump and gravity drainage outlet operation. The foregoing pumping station capacities were based upon the consideration that the gravity drainage outlet gates would be closed when river or diversion channel stages exceeded the landside invert elevations of the outlets. Some reduction in pump capacity requirements may be effected if the gravity drainage outlets are assumed to be

operable during the pumping cycle when impoundment levels within the districts are higher than the river or diversion channel stages. Consideration will be given to such coincident operation in the pre-construction design analyses.

(6) Comparison of current and preliminary examination plans of improvement. The consideration in the Preliminary Examination Report on Drainage Improvements, Perry County Drainage and Levee Districts Nos. 1, 2, and 3, that a plan of flood control improvement appeared to be economically justified, was based on the construction of three pumping stations at the Bois Brule, Cinque Hommes, and Jones Cutoff sites. The report was completed prior to the inclusion of Crains and Puckett Islands within the levee project area as discussed in paragraph 5 above. The areas of these islands now constitute the Missouri Chute area for which the fourth pumping station has been determined to be required.

b. Intake ditches. New ditches would be constructed connecting the pumping stations with the existing ditch systems. All would have 1 on 3 side slopes and approximate lengths of 200 feet. Bottom widths would be 30 feet at the Cinque Hommes station and 25 feet at the other three stations.

c. Pump discharge lines. Each pump would be equipped with a discharge pipe extending over the levee and emptying into a basin located at the toe of the riverside levee berm.

d. Diversion ditches. A diversion ditch 3,300 feet in length with a 4-foot bottom width and 1 on 3 side slopes would divert runoff normally collected at the 24-inch gravity drainage structure at levee station 1510+56 to the Bois Brule pumping station. The alignment would be along and near the landside base of the back levee berm. Another diversion would be required to divert runoff from the 18-inch gravity drainage outlet structure at Claryville to the upstream portion of Missouri Chute. This ditch would be a "V" ditch, approximately 10,600 feet in length with 1 on 2 side slopes. A substantial portion of the alignment would be in a swale adjacent to and riverward of a road between Claryville and Belgique. These ditches, shown on PLATE 1, provide more economical alleviation of flood damages than would the inclusion of additional pumping facilities at the 24- and 18-inch outlets.

e. Seepage control measures. A study of subsoil conditions shows that two T-type seepage control wells would be needed along each pumping station intake ditch.

f. Levee enlargement. Levee grades would be raised two feet for a distance of 1,000 feet on each side of the proposed pumping stations. This would minimize the possibility of damage to the stations in the event levees are overtopped in the immediate vicinity.

g. Land acquisition. The proposed improvements would require the acquisition of about six acres of right-of-way for the Bois Brule pumping station, 14 acres for the Missouri Chute pumping station, three acres for the Cinque Hommes pumping station, and two acres for the Jones Cutoff pumping station.

SECTION V - ESTIMATES OF FIRST COSTS

21. ESTIMATES OF FIRST COSTS

The estimates of first costs for the proposed plan of improvement are based on the assumption that the United States will construct the pumping stations and diversion ditches and enlarge and raise the levees in the vicinity of the stations. Local interests will furnish all lands, easements, and rights-of-way required for forebay, discharge bay, borrow pits, the ditch connecting the pumping station with the existing drainage system and the diversion ditches. Preauthorization costs amount to \$175,000.

a. Cost basis. Cost estimates used herein are based on July 1971 prices. It is assumed that construction of each pumping station and associated ditching will be accomplished in less than two years.

b. Scope of cost estimates. Detailed estimates of costs of the proposed Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff improvement facilities are given in TABLES C-1, C-2, C-3, and C-4, respectively, of APPENDIX C, ESTIMATES OF COSTS. Initial cost estimates for other capacities used in developing the optimum size of pumps are shown in TABLES B-14 through B-19, APPENDIX B. Data on financial and economic costs are given in TABLES C-5 through C-8. Costs for principal features of the improvements, each of which include contingencies, are shown in the following TABLES 1, 2, 3, and 4.

TABLE 1
Estimated first costs
Bois Brule Pumping Station
(100 c.f.s.)

Federal first costs

Levees		\$ 67,000
Seepage control measures		15,000
Ditching		13,000
Pumping station		
Substructure	\$151,000	
Superstructure and misc. steel	47,000	
Dewatering system	25,000	
Mechanical installation	79,000	
Electrical installation	25,000	
Site work	18,000	
Discharge piping	45,000	
Power supply	<u>37,000</u>	
Total pumping station		427,000
Environmental protection		17,000
Maintenance during construction		6,000
Engineering and design		80,000
Supervision and administration		<u>45,000</u>
Total Federal first costs		\$670,000

Non-Federal first costs

Lands and damages	\$ <u>6,000</u>	
Total non-Federal first costs		\$ 6,000
Total Federal and non-Federal first costs		\$676,000

TABLE 2
Estimated first costs
Missouri Chute Pumping Station
(60 c.f.s.)

Federal first costs

Levees		\$ 67,000
Seepage control measures		15,000
Ditching		16,000
Pumping station		
Substructure	\$140,000	
Superstructure and misc. steel	43,000	
Dewatering system	25,000	
Mechanical installation	56,000	
Electrical installation	19,000	
Site work	17,000	
Discharge piping	35,000	
Power supply	26,000	
Total pumping station		361,000
Environmental protection		15,000
Maintenance during construction		6,000
Engineering and design		70,000
Supervision and administration		40,000
Total Federal first costs		\$590,000

Non-Federal first costs

Lands and damages	<u>\$17,000</u>	
Total non-Federal first costs		<u>\$ 17,000</u>
Total Federal and non-Federal first costs		\$607,000

TABLE 3
Estimated first costs
Cinque Hommes Pumping Station
(130 c.f.s.)

Federal first costs

Levees		\$ 67,000
Seepage control measures		15,000
Pumping station		
Substructure	\$151,000	
Superstructure and misc. steel	47,000	
Dewatering system	25,000	
Mechanical installation	98,000	
Electrical installation	26,000	
Site work	18,000	
Discharge piping	45,000	
Power supply	<u>52,000</u>	
Total pumping station		462,000
Environmental protection		17,000
Maintenance during construction		6,000
Engineering and design		85,000
Supervision and administration		<u>48,000</u>
Total Federal first costs		\$700,000

Non-Federal first costs

Lands and damages	<u>\$ 3,000</u>	
Total non-Federal first costs		<u>\$ 3,000</u>
Total Federal and non-Federal first costs		\$703,000

TABLE 4
Estimated first costs
Jones Cutoff Pumping Station
(115 c.f.s.)

Federal first costs

Levees		\$ 67,000
Seepage control measures		15,000
Borrow pit drains		7,000
Pumping station		
Substructure	\$151,000	
Superstructure and misc. steel	47,000	
Dewatering system	25,000	
Mechanical installation	94,000	
Electrical installation	25,000	
Site work	18,000	
Discharge piping	45,000	
Power supply	<u>60,000</u>	
Total pumping station		465,000
Environmental protection		17,000
Maintenance during construction		6,000
Engineering and design		85,000
Supervision and administration		<u>48,000</u>
Total Federal first costs		\$710,000

Non-Federal first costs

Lands and damages	<u>\$ 2,000</u>	
Total non-Federal first costs		<u>\$ 2,000</u>
Total Federal and non-Federal first costs		\$712,000

SECTION VI - ECONOMIC ANALYSIS

22. ESTIMATES OF ANNUAL CHARGES

Amortization of both the Federal and non-Federal investments in the interior flood control improvements was computed for an assumed economic life of 100 years. It is estimated that construction of the pumping plants would be accomplished in less than two years. The reasons for sizing the pump capacities and the manner of treating major replacements are discussed in paragraph 23. Estimated annual charges are shown in TABLES 5, 6, 7, and 8.

TABLE 5
Estimated annual charges
Bois Brule Pumping Station
(100 c.f.s.)

A. FEDERAL

Federal investment

Total Federal project net first costs \$670,000

Total Federal investment \$670,000

Federal annual charges

1. Interest on investment @ 5-1/8%	\$ 34,338	
2. Amortization of investment @ 0.00035 for 100 years	<u>234</u>	\$ 34,572
Total Federal annual charges	use	\$ 34,600

B. NON-FEDERAL

Non-Federal investment

Total non-Federal project net first costs \$ 6,000

Total non-Federal investment \$ 6,000

TABLE 5 (cont'd)

Non-Federal annual charges

1.	Interest on investment @ 5-1/8%	\$ 308	
2.	Adjustment for net loss in productivity of land (\$3,600) @ 7/8%	32	
3.	Amortization of investment, 100 years, @ 5-1/8% (0.00035)	2	
4.	Major replacements, present worth of \$494,000 due 50 years hence @ 5-1/8% (0.08217)= \$40,592 (0.05160) for 100 years	2,095	
5.	Maintenance and operation of pumping station and ditch	<u>14,000</u>	
Total non-Federal annual charges			\$16,437
		use	\$16,400
Total Federal and non-Federal annual charges			\$51,000

TABLE 6
Estimated annual charges
Missouri Chute Pumping Station
(60 c.f.s.)

A. FEDERAL

Federal investment

Total Federal project net first costs \$590,000

Total Federal investment \$590,000

Federal annual charges

1. Interest on investment @ 5-1/8% \$ 30,238

2. Amortization of investment @
0.00035 for 100 years 206

Total Federal annual charges \$ 30,444

use \$ 30,400

B. NON-FEDERAL

Non-Federal investment

Total non-Federal project net
first costs \$ 17,000

Total non-Federal investment \$ 17,000

Non-Federal annual charges

1. Interest on investment @ 5-1/8% \$ 871

2. Adjustment for net loss on pro-
duction of land (\$11,200) @ 7/8% 98

3. Amortization of investment, 100
years @ 5-1/8% (0.00035) 6

4. Major replacements, present
worth of \$425,000 due 50 years
hence @ 5-1/8% (0.08217)=
\$34,922. Interest and amortiza-
tion on \$34,922 (0.05160) for 100
years 1,802

TABLE 6 (cont'd)

5. Maintenance and operation of pump- ing station and ditch	<u>18,000</u>	
Total non-Federal annual charges		\$ 20,777
	use	\$ 20,800
Total Federal and non-Federal annual charges		\$ 51,200

TABLE 7
Estimated annual charges
Cinque Hommes Pumping Station
(130 c.f.s.)

A. FEDERAL

Federal investment

Total Federal project net first costs	<u>\$700,000</u>	
Total Federal investment		\$700,000

Federal annual charges

1. Interest on investment @ 5-1/8%	\$ 35,875	
2. Amortization of investment @ 0.00035 for 100 years	<u>245</u>	
Total Federal annual charges		\$ 36,120
	use	\$ 36,100

B. NON-FEDERAL

Non-Federal investment

Total non-Federal project net first costs	<u>\$ 3,000</u>	
Total non-Federal investment		\$ 3,000

Non-Federal annual charges

1. Interest on investment @ 5-1/8%	\$ 154	
2. Adjustment for net loss on pro- duction of land (\$1,800) @ 7/8%	16	
3. Amortization of investment, 100 years @ 5-1/8% (0.00035)	1	
4. Major replacements, present worth of \$520,000 due 50 years hence @ 5-1/8% (0.08217)= \$42,728 (0.05160) for 100 years	2,205	

TABLE 7 (cont'd)

5. Maintenance and operation of pump-
ing station32,000

Total non-Federal annual charges

\$ 34,376

use \$ 34,400

Total Federal and non-Federal annual
charges

\$ 70,500

TABLE 8
Estimated annual charges
Jones Cutoff pumping station
(115 c.f.s.)

A. FEDERAL

Federal investment

Total Federal project net first costs \$ 710,000

Total Federal investment \$710,000

Federal annual charges

1. Interest on investment @ 5-1/8% \$ 36,388

2. Amortization of investment @
0.00035 for 100 years 249

Total Federal annual charges \$ 36,637

use \$ 36,600

B. NON-FEDERAL

Non-Federal investment

Total non-Federal project net
first costs \$ 2,000

Total non-Federal investment \$ 2,000

Non-Federal annual charges

1. Interest on investment @ 5-1/8% \$ 102

2. Adjustment for net loss on pro-
duction of land (\$1,600) @7/8% 14

3. Amortization of investment, 100
years @ 5-1/8% (0.00035) 1

4. Major replacements, present
worth of \$512,000 due 50 years
hence @ 5-1/8% (0.08217)=
\$42,071. Interest and amorti-
zation on \$42,071 (0.05160) for
100 years 2,171

TABLE 8 (cont'd)

5. Maintenance and operation of pump- ing station	<u>19,000</u>	
Total non-Federal annual charges		\$ 21,288
	use	\$ 21,300
Total Federal and non-Federal annual charges		\$ 57,900

23. ESTIMATES OF BENEFITS

The economy of the districts is projected to remain agricultural over the economic life of considered improvements. The only projected change in development in the economic analysis is an intensification of land use for agricultural purposes resulting from technological advancements in agronomic practices. About 280 acres or approximately one percent of the land in the districts is in small scattered lots of trees and idle cropland, some of which could eventually be converted to idleland. However, many of these lots are in areas to be benefitted the least by the considered improvements. In view of the uncertainty of conversion within the economic life span of the improvements, no benefits were assigned for conversion in the economic analysis. Benefits creditable to the improvements consist of damages eliminated to both crops and rural property and increased crop returns. The frequency of occurrence and severity of flood events have been based on the assumption that the future combination of rainfall and river stage events are best characterized by occurrences during the 57-year period, 1913-1969, inclusive, with river stage data adjusted to 1947-1951 channel conditions. The measure of damages eliminated is the difference in damages caused by those flood events without and with improvements. The quantification of increased return benefits has been based on the consideration that alleviation of flooding through improvements would induce farmers to implement and move toward higher crop value production resulting in greater financial returns. The increased returns that would accrue from this more intensive land use are credited to the improvements as increased return benefits. Both damages eliminated and increased return benefits have been used on State-adjusted normalized prices modified to local market conditions.

a. Considerations in net benefit maximization. The districts' levee protection, completed in 1968, is estimated to have an economic and practical life of 100 years. With the interior flood control improvements proposed herein functioning as adjuncts to the levee works in providing flood protection, the sizing of the interior flood control improvements would normally be based on an equivalent economic life. However, agronomic and practical engineering considerations indicate the desirability of using a lesser period for arriving at a practical and realistic solution to pump size determination. Crop yield projections to year 2020 were developed using guidelines developed by the Economic Research Service of the U. S. Department of Agriculture for the Upper Mississippi River Comprehensive Basin Study and the Water Resources Council. In addition to in-depth analysis of potential yields and technological improvements in production efficiency, the Economic Research projections were based on

regional and national future demand requirements of the projected population for food, feed and fiber and regional variations in production costs indicating likely shifts over time in the types of crops to be grown. Thus, the projections to the year 2020 are considered to have a rational basis. Because of uncertainty concerning the nature of technological advances in production and the magnitude of changes in employment, as well as the shift in the character of the economy at that time, projections of crop yields and distributions likely to be experienced in the second 50-year period after installation of improvements, are difficult to evaluate with confidence. Since the type of project considered herein lends itself to staged construction, initial installation could be made to satisfy the needs for the first 50 years and subsequent additions could readily be made to meet the needs for the second 50 years, if required. Optimum pump capacities proposed herein are based upon projections for the initial 50-year period.

b. Treatment of economic justification. With the proposed improvements being developed for a considered 100-year economic life, the evaluation of benefits for the second 50 years in the 100-year amortization period is required for determination of economic justification. Crop yields for that period were developed by extrapolating the initial 50-year yields, substantially reducing the initial 50-year period rate of growth to a conservatively low but relatively well assured level. Average crop distributions were modified but slightly during the second 50-year period for estimates for the 50th year. Under anticipated operating conditions, major replacements would not be required in the pumping equipment within the first 50 years. In order to evaluate conservatively the economic worth of the proposed improvements on a 100-year basis, major replacement costs have been included for the 51st year equal to the initial pumping station costs shown in TABLES 1, 2, 3, and 4, plus engineering and design and supervision and administration costs for that feature item. Real estate costs for the pumping stations have been excluded. While the 50th year reanalysis may show a need for some additional pump capacity, funds equal to initial construction costs are considered to be adequate for such replacements. There should be no significant replacement costs for certain items such as power supply, and it is conceivable that the pumping station structure will be usable until the end of the 100-year project life. Also, there is a likelihood that there will be marked increases in pump equipment efficiency in the next 50 years as there has been in the past, thereby further reducing the costs of replacement equipment. It is, thus, considered that inclusion of costs equivalent to the initial pumping station installation costs insures that the benefit-cost ratio adequately reflects project replacement.

c. Average annual benefits. Average annual benefits estimated to accrue to the improvements over the 100-year period are summarized in TABLE 9, together with corresponding annual project costs. It will be noted that no change in property development is anticipated during the period. Derivation of the benefits is contained in APPENDIX B.

d. Land ownerships benefitted. Of the 154 ownerships subject to flooding within the districts, varying degrees of flood damage reduction would be effected by the considered improvements to 134 ownerships. In the three largest holdings, lands subject to flooding would be reduced from 1,461, 377, and 140 acres to 1,051, 317, and 99 acres, respectively. These three ownerships comprise about 12 percent of the land in the districts and about 16 percent of the area subject to flooding. Flooding would be alleviated in about 87 percent of the ownerships. It is the view of the District Engineer that benefits received by them would not constitute "windfall benefits of unconscionable magnitude accruing to limited special interests" and therefore no cash contribution for the costs of the improvements is considered warranted.

TABLE 9

Average Annual Project Benefits and Costs
(100-year economic life)

Area	Bois Brule Pumping Station	Missouri Chute Pumping Station	Cinque Hommes Pumping Station	Jones Cutoff Pumping Station	Total
A. PUMP CAPACITY (c.f.s.)	100	60	130	115	
B. BENEFITS					
<u>Benefits to development existing at beginning of project life</u>					
Crop damage reduction	\$51,800	\$52,700	\$89,100	\$43,400	\$237,000
Property damage reduction	1,000	1,200	1,600	800	4,600
TOTAL	\$52,800	\$53,900	\$90,700	\$44,200	\$241,600
<u>Benefits to additional development anticipated during economic analysis period with or without project</u>					
Crop damage reduction	\$ 9,900	\$11,800	\$20,600	\$ 9,100	\$ 51,400
Property damage reduction	0	0	0	0	0
TOTAL	\$ 9,900	\$11,800	\$20,600	\$ 9,100	\$ 51,400
<u>Benefits from development potentials</u>					
Increased returns	\$15,000	\$12,700	\$17,300	\$10,400	\$ 55,400
<u>Total benefits to development during project economic life</u>					
Crop damage reduction	\$61,700	\$64,500	\$109,700	\$52,500	\$288,400
Property damage reduction	1,000	1,200	1,600	800	4,600
Increased return benefits	15,000	12,700	17,300	10,400	55,400
TOTAL BENEFITS	\$77,700	\$78,400	\$128,600	\$63,700	\$348,400
C. COSTS					
Average Annual Federal and Non-Federal Costs	\$51,000	\$51,200	\$70,500	\$57,900	\$230,400
D. BENEFIT-COST RATIO	1.5	1.5	1.8	1.1	1.5

SECTION VII - PROPOSED LOCAL COOPERATION

24. GENERAL

The proposed plan of improvement was presented to the land-owners and operators in Perry County Drainage and Levee Districts Nos. 1, 2, and 3 at a public meeting held in Perryville, Missouri, on 28 April 1971. Local interests were advised of the costs and other requirements for local cooperation in the project as given below.

- a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project;
- b. Hold and save the United States free from damages due to the construction works;
- c. Maintain and operate the project, including the pumping stations, after completion in accordance with regulations prescribed by the Secretary of the Army;
- d. Clean silt and debris from existing ditches on a continuing maintenance basis, as necessary, to provide unrestricted flow to the pumping stations;
- e. Prevent obstruction or encroachment in channels necessary for proper functioning of the project;
- f. Comply with all applicable provisions in the Uniform Relocation Assistance and Real Property Acquisition Act of 1970; and,
- g. At least annually, inform interests affected that the project will not provide complete protection against flooding.

25. AGREEMENT

The districts' commissioners and landowners were informed that the pump capacities recommended would not eliminate all damages from local runoff, but would produce the greatest excess of benefits over costs when compared with both smaller and larger pump capacities. They were further informed that the average annual maintenance and operation costs have been estimated at

\$14,000, \$18,000, \$32,000, and \$19,000 for the Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff pumping stations, respectively. The commissioners and landowners agreed that the plan of improvement was acceptable and that the terms of local cooperation could be expected. The District Engineer is of the opinion that, in view of the past history of the levee project, the required local cooperation will be forthcoming if the plan of improvement is authorized and constructed.

SECTION VIII - COORDINATION WITH OTHER AGENCIES

26. COORDINATION WITH OTHER AGENCIES

Federal and State agencies considered to have an interest in the plan of improvement were furnished a copy of the Plan of Survey on the plan of improvement. Those agencies expressing an interest were also furnished a draft copy of the report for review. Their comments and, where pertinent, the St. Louis District's replies, are given in APPENDIX D, COMMENTS OF OTHER AGENCIES. Pertinent remarks from their comments follow:

a. U. S. Department of Agriculture, Soil Conservation Service.
"The proposed plan is certainly needed for maintaining and improving the agricultural production on the 26,050 acres of developed land. We are currently furnishing technical assistance to landowners in this area through the Perry County Soil and Water Conservation District. We would certainly be glad to assist in applying the associated land treatment measures on individual lands that would help achieve the benefits proposed in this plan. We have no PL-566 project activity in this area at the present time. We would suggest encouraging the drainage district to promote soil and water conservation measures on the upland above the diversion ditch. We believe that this would significantly reduce the maintenance needed on this diversion."

b. U. S. Department of the Interior.

(1) Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife. "The proposed diversion ditches could destroy isolated tracts of wildlife habitat. However, project proposals generally will not have a significant adverse effect on the fish and wildlife. Further, the proposed project does not offer feasible opportunities for the enhancement of fish and wildlife.

"Although not specifically applicable to your project proposal, the following suggestions are provided for consideration by the Levee and District Commissioners. Adoption of any or all of these measures would help increase the supply of game in this area:

(a) "Promote the application of land treatment and cropping measures to maintain cover on the land for as much of the year as possible.

(b) "Preserve isolated blocks of timber within the levee districts.

(c) "Delay initial mowing of levee slopes until August 1 to prevent unnecessary destruction of nesting game birds and song birds.

(d) "Urge the discontinuance of indiscriminate burning of levee slopes to permit winter cover to remain available.

(e) "Grazing of levee berms and slopes should not be allowed."

(2) Federal Water Pollution Control Administration. "This project, which will provide internal drainage to the protected lands, has no significant water quality aspects."

(3) Bureau of Outdoor Recreation. "We have no comments to make on the proposed plan of improvement at the present time."

(4) Geological Survey. "We have no comments or suggestions concerning the proposed study."

(5) Bureau of Mines. "The Bartlesville Office of Mineral Resources is concerned with reviewing any resulting report and plans to determine their possible involvement with mineral resources and installations in the Missouri part of the described area.

"Our office records of the mineral industry reveal that limestone from an unspecified locality is currently the only mineral commodity produced in Perry County. Limestone was formerly quarried near Menfro, adjacent to the study area. Resources of silica sand and inactive lead, zinc, and iron mines or prospects are elsewhere in the county. A 20-inch oil pipeline of Magnolia Pipeline Company crosses the northern part of the study area. The amount and value of limestone produced annually are significant but cannot be revealed, as they are company confidential information.

"Any mineral resources or facilities, including the oil pipeline, that are within the study area warrant examination by qualified personnel to determine their relationship to construction that may be recommended under the proposed survey. Implied or stated provisions for such examination would make the Plan of Survey acceptable to the Bartlesville Office of Mineral Resources."

(6) Southwestern Power Administration. "Any improvements which might be proposed for the area will not affect our interests."

(7) National Park Service, Northeast Region. "We find that this project would not presently be of interest to this Service."

c. State of Missouri.

(1) Water Resources Board. "Field review of your draft 'Survey Report on Interior Flood Control Improvements, Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri' has been completed. The State position regarding this project is one of early implementation for those improvements recommended in your report.

"The comments assembled from Missouri state agencies emphasized concern over the environmental effects of the project and have been transmitted separately in reply to your request for comments on the environmental impact statement.

"To assure minimum effects resulting from improved efficiency on existing crop lands within the drainage district, we request that Corps of Engineers personnel working in the area emphasize the importance of retaining existing woodlands and marsh areas to benefit fish and wildlife. Landowners should be encouraged to contact the Missouri Department of Conservation for assistance and advise in retaining and enhancing wildlife habitat within the districts."

(2) Department of Conservation. The U. S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, furnished the Missouri Department of Conservation a copy of the Plan of Survey. Following is a portion of the reply to the Acting Regional Supervisor of the Bureau of Sport Fisheries and Wildlife.

"Based on a study of the file and a field inspection of the area, the recommendations and conclusions closely parallel our thinking. Recommendation number four pertaining to burning might be reworded slightly to be less positive about discontinuing burning. From a wildlife standpoint, the most desirable conditions would exist from the initial stage, when vegetation is knocked back, through a period of some three or four years of natural succession. At that stage, considering that the aim of the district will be to keep

the levee in a non-woody cover, from a wildlife standpoint, a burn might be feasible to again set back succession."

d. State of Illinois Department of Business and Economic Development. "The Illinois Natural Resource Development Board has reviewed the report and has no adverse comment to make."

SECTION IX - THE RESULTS OF THE INVESTIGATION

27. DISCUSSION

Perry County Drainage and Levee Districts Nos. 1, 2, and 3 contain 26,881 acres of which about 97 percent is either cultivated or in "Feed Grain Program" diverted acreage. The districts are protected by a levee against a design flood in the Mississippi River, having a two percent chance of occurrence. The levee project, authorized by the Flood Control Act of 22 June 1936, was completed in 1968. In addition to the 26,881 acres which lie in the Mississippi River flood plain, there are 30 acres of tributary hill land from which runoff is received by the districts. Levee maintenance and cooperation by local interests are rated as "very satisfactory".

a. Damage from blocked drainage. There is an average of approximately 5,849 acres of bottom land flooded annually by the accumulation of interior drainage. For the purpose of this report, the 57-year period, 1913-1969, was selected as representative of typical hydraulic conditions which could be expected to occur in the future. Annual Mississippi River hydrographs, as experienced, were modified to reflect future conditions by use of the 1947-1951 rating curve. During the 57-year period, there were 53 years during which the gravity outlets were blocked by river stages and lands were inundated. The average number of days of blocked gravity drainage was 91 days per year, and the maximum number of consecutive days was 148. The average annual damages to both crops and property resulting from blocked drainage currently amount to \$308,400 and are estimated to increase to \$417,500 per year by the time the proposed project is placed in operation, estimated to be in 1975. Under future conditions of anticipated development, these damages would average \$508,300 annually.

b. Plans investigated. Five plans of improving interior drainage were investigated. The barrier dam plan provides for the construction of a gated barrier dam across the mouth of the diversion channel located between the back levee and the bluffs. Pumping facilities at the dam would pump runoff from the Bois Brule, Cinque Hommes, Jones Cutoff areas and from 71,500 acres of bluffland tributary to the channel when the dam gates are closed due to high river stages. A second pumping station would be provided at the Missouri Chute gravity drainage outlet structure to discharge runoff from that drainage area. Additional plans were investigated, all involving pumping facilities varying from one to four and

associated ditching. One plan would consist of a pumping station near the Cinque Hommes gravity drainage outlet structure with ditches diverting runoff from all other drainage areas to it. Another plan would have pumping stations near the Cinque Hommes and Bois Brule gravity drainage outlets. As in the one-station plan, runoff from the Missouri Chute area would be diverted to Cinque Hommes Creek. A third plan would include a pumping station in the Missouri Chute area in addition to those in the two-station plan. The fourth plan would contain the three stations, together with an additional pumping station in the Jones Cutoff area.

c. Recommended plan. The four-pumping station plan was found to be the most practical and economical of the several plans investigated. For this plan, a comparison of benefits and costs for various pump capacities showed that capacities of 100, 60, 130, and 115 cfs produced the greatest excess of benefits over costs for the Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff pumping stations, respectively. Two small diversion ditches, one between the 24-inch gravity drainage outlet structure located approximately 3,600 feet to the west of the Bois Brule station, and the other, from Claryville to the upper portion of Missouri Chute, would be required. Installation of these facilities would reduce the average annual acres flooded from about 5,849 to 2,421 acres, average annual crop damages under future conditions of development, from \$500,800 to \$212,400, and average annual property damage from \$7,500 to \$2,900. The benefits from those reductions total \$293,000. In addition, the reduction in flooding would, with a high degree of management, permit improved cropping practices conducive to high crop yields. Total increases in net returns to farmers from this source are estimated to average \$55,400 annually. Total average annual benefits, including the increased net return benefits for the project plan amount to \$348,400. The total cost of this project is estimated at \$2,698,000, of which the Federal portion would be \$2,670,000 and the non-Federal, \$28,000. Total annual charges, including maintenance and operation, are estimated at \$230,600, resulting in a project benefit-cost ratio of 1.5.

d. Impact of the recommended plan on the environment. The flood damage reduction effects of the proposed improvements would permit more efficient utilization of the agricultural soils and would improve the quality of man's life through an increase in economic returns and a decrease in wasted labor. It is anticipated that upon the advent of better drainage, some of the districts' 280 acres of woodland and idle land will eventually be converted to cropland. Additionally, the proposed improvements will occupy about 25 acres

of agricultural land. While loss of cover in these areas will have a depressing effect on the already limited wildlife population, the overall environmental effect of the project on the areas natural systems will be negligible. No significant historical, cultural, or biological sites will be disturbed, and the project will not exert an adverse, esthetic impact on the area.

e. Actions proposed to improve the environment. Every effort will be made to eliminate or minimize damage to the environment during construction. The scope of environmental consideration during construction includes positive action, such as shaping and seeding all land slopes to prevent erosion, preserving trees, preserving air quality in the disposal of clearing products, and general landscaping preservation. The limited extent of wildlife habitat losses anticipated after project completion is not considered sufficient to require mitigatory measures. However, the following actions to enhance wildlife populations within the districts will be undertaken: (1) a plan of recommended wildlife management practices emphasizing the establishment and preservation of wildlife cover in the maintenance of project facilities will be developed during the preconstruction planning phase and presented to the levee district commissioners; (2) wildlife food and cover plantings, compatible with drainage functions, will be established along the spoil banks of the 13,900 feet of new ditches; (3) low maintenance wildlife food and cover plants will be established in the area around the pumping station; and, (4) landowners will be encouraged to contact the Missouri Department of Conservation for assistance and advice in retaining and enhancing wildlife habitat within the districts.

f. Relocations. The recommended plan of improvement will not require the relocation of persons or businesses. In the event the plan is altered prior to construction of the improvements or new buildings are located on the proposed rights-of-way, the plan of improvement will be modified to minimize relocations. If modification is impractical, the relocations will be accomplished in accordance with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as contained in Public Law 91-646.

g. Additional information. Additional information, called for by Senate Resolution 148, 85th Congress, adopted 28 January 1958, is contained in Attachment 1 to this report.

SECTION X - CONCLUSIONS

28. CONCLUSIONS

As the result of this investigation of the existing flood problems within Perry County Drainage and Levee Districts Nos. 1, 2, and 3, it is concluded that:

a. Under conditions anticipated during the economic life of the project, damages from impounded rainfall and seepage runoff during blocked gravity drainage periods will be substantial.

b. The capacities of the existing gravity drainage outlets are considered adequate for passing runoff during non-blocked river stages.

c. Nonstructural solutions for reducing flood damages in this agricultural area are impractical.

d. The most feasible solution to the interior flood problem is the installation of pumping facilities, consisting of four pumping stations having capacities of 100, 60, 130 and 115 cfs for the Bois Brule, Missouri Chute, Cinque Hommes, and Jones Cutoff areas, respectively, and 13,900 feet of ditching. Total cost of the plan is \$2,698,000, of which \$2,670,000 is Federal and \$28,000 is non-Federal. Annual charges for the plan of improvement are \$230,600, and annual benefits are estimated at \$348,400. The benefit-cost ratio is 1.5.

e. Local interests have indicated that requirements of local cooperation would be forthcoming.

SECTION XI - RECOMMENDATION

29. RECOMMENDATIONS

The District Engineer recommends that:

a. The existing project for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, in Perry County, Missouri, and Randolph County, Illinois, be modified to provide for the construction of four pumping stations and appurtenant facilities, all as described herein, at an estimated first cost to the United States of \$2,670,000.

b. The installation of the improvement be contingent upon Perry County Drainage and Levee Districts Nos. 1, 2, and 3, furnishing assurances satisfactory to the Secretary of the Army that they will:

(1) Provide without cost to the United States, all lands, easements, and rights-of-way necessary for the construction of the project;

(2) Hold and save the United States free from damages to the construction works;

(3) Maintain and operate the project, including the pumping stations, after completion in accordance with regulations prescribed by the Secretary of the Army;

(4) Clean silt and debris from existing ditches, on a continuing maintenance basis, as necessary, to provide unrestricted flow to the pumping stations;


(5) Prevent obstruction or encroachment in channels necessary for proper functioning of the project;

(6) Comply with all applicable provisions in the Uniform Relocation Assistance and Real Property Acquisition Act of 1970; and,

(7) At least annually, inform interests affected that the project will not provide complete protection against flooding.

4 Incl

1. Appendix A, Hydrology and Hydraulics
2. Appendix B, Damages and Benefits
3. Appendix C, Estimates of Costs
4. Appendix D, Comments of other Agencies


CARROLL N. LeTELLIER
Colonel, CE
District Engineer

[First endorsement]

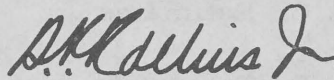
LMVPD-F (SLD rpt 30 Jun 71)

SUBJECT: Survey Report on Interior Flood Control Improvements - Perry
County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg,
Mississippi 39180 23 July 1971

TO: Chief of Engineers

I concur in the findings and recommendations of the District Engineer.

A handwritten signature in dark ink, appearing to read "A. P. Rollins, Jr.", written in a cursive style.

A. P. ROLLINS, JR.
Major General, USA
Division Engineer

APPENDIX D
COMMENTS OF OTHER AGENCIES



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

IN REPLY REFER TO:

RB

Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

December 2, 1970

Col. Carroll N. LeTellier
District Engineer
U. S. Army Engineer District
St. Louis
210 North 12th Street
St. Louis, Missouri 63101

Dear Col. LeTellier:

We have examined the Preliminary Plan of Survey for improving interior drainage within the Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois. This report has been prepared under the authority and in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U. S. C. 661 et seq.).

The Preliminary Plan of Survey proposes to determine the feasibility of modifying the existing flood protection project by providing pumping stations and diversion ditches. The drainage and levee districts contain approximately 26,050 acres of highly developed agricultural land. Gravity drainage is blocked during periods of high flow in the Mississippi River when local runoff becomes impounded within the districts.

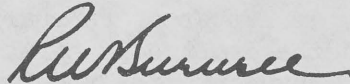
The proposed diversion ditches could destroy isolated tracts of wildlife habitat. However, project proposals generally will not have a significant adverse effect on the fish and wildlife resource. The project does not offer feasible opportunities for the enhancement of fish and wildlife.

Although not specifically applicable to your project proposal, the following suggestions are provided for consideration by the Levee District Commissioners. Adoption of any or all of these measures would help increase the supply of game in this area:

1. Promote the application of land treatment and cropping measures to maintain cover on the land for as much of the year as possible.
2. Preserve isolated blocks of timber within the levee districts.
3. Delay initial mowing of levee slopes until August 1 to prevent unnecessary destruction of nesting game birds and song birds.
4. Urge the discontinuance of indiscriminate burning of levee slopes to permit winter cover to remain available.
5. Grazing of levee berms and slopes should not be allowed.

If there is a major change in project proposals, please advise us so that we may provide additional comments.

Sincerely,



R. W. Burvell
Regional Director

cc: Illinois Department of Conservation
Missouri Department of Conservation



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

IN REPLY REFER TO:

RB

Federal Building, Fort Snelling

Twin Cities, Minnesota 55111

March 10, 1971

Col. Carroll N. LeTellier
District Engineer
U. S. Army Engineer District
St. Louis
210 North 12th Street
St. Louis, Missouri 63101

Dear Col. LeTellier:

In response to your letter of February 24, 1971 (File LMSED-BG), we have reviewed the draft copy of the Survey Report of Interior Flood Control Improvements for the Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois.

We are pleased to note that the recommendations of our December 2, 1970, report have been included in the body of the Survey Report. We were unable to determine, however, if our recommendations will be incorporated into the project plan. Accordingly, we would like to know which recommendations are acceptable and which ones are unacceptable, as provided for in part 3 of the August 20, 1954, agreement between the Fish and Wildlife Service and the Corps of Engineers.

Sincerely,

John R. Langenbach
Acting Regional Director

cc: Missouri Department of Conservation
Illinois Department of Conservation

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 459, Columbia, Missouri 65201

March 29, 1971

A. J. Tiefenbrun, Assistant Chief
Engineering Division for Planning
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

RE: LMSD-BG

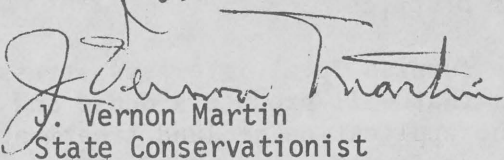
Dear Mr. Tiefenbrun:

We have reviewed the draft copy of the Survey Report on Interior Flood Control Improvements for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri.

The proposed plan is certainly needed for maintaining and improving the agricultural production on the 26,050 acres of developed land. We are currently furnishing technical assistance to landowners in this area through the Perry County Soil and Water Conservation District. We would certainly be glad to assist in applying the associated land treatment measures on individual lands that would help achieve the benefits proposed in this plan. We have no PL-566 project activity in this area at the present time. We would suggest encouraging the drainage district to promote soil and water conservation measures on the upland above the diversion ditch. We believe that this would significantly reduce the maintenance needed on this diversion.

We appreciate the opportunity to review the report. If we can be of any additional assistance to you, please let us know.

Sincerely,


J. Vernon Martin
State Conservationist



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

LMSD-B

20 April 1971

Mr. John R. Langenbach
Acting Regional Director
Bureau of Sport Fisheries and Wildlife
United States Department of the Interior
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Dear Mr. Langenbach:

Reference is made to:

a. Letter, dated 2 December 1970, from Mr. Burwell, Regional Director, Bureau of Sport Fisheries and Wildlife, to this office, in which five recommended measures are listed that would help increase the supply of game in Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois.

b. Your letter, dated 10 March 1971, to this office, wherein you ask if your recommendations will be incorporated into the project plan for interior flood control and which of the recommendations are acceptable.

With regard to questions in reference b. above, the recommendations in reference a. are applicable to the levee project which has been completed and transferred to local interests. The following comments pertain to all levee projects in St. Louis District:

Item 1. The maintenance manuals we furnish local interests stress a grass cover program for project lands that will produce a dense sod resistant to wave wash and erosion. The application of land treatment and cropping measures on non-project lands for the purpose of maintaining cover as much of the year as possible is considered to be compatible with interior drainage improvements and is encouraged.

Item 2. This office does stress the preservation of timber along the Mississippi riverside of the levee projects as a protection measure against wave wash. However, timber growth along the flank levees and tributaries is not recommended because drift collections and siltation tend to reduce the tributary channel capacity.

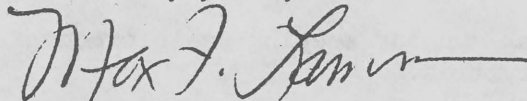
Item 3. A delay in the initial mowing of the levee slopes until August is not recommended. Two or three mowings annually, with the initial mowing usually being in May, are necessary for weed and brush control. It is believed that the Federal and State highway departments would concur in this practice since the mowing of their rights-of-way for this purpose is very well maintained. A safety measure is also involved since, should eroded areas develop which are not visible due to the height of weedy growth, the mowing equipment could be turned over. This office recommends a growth of 8 to 14 inches going into the fall or dormant season.

Item 4. Operation and maintenance manuals furnished local interests by this office state that the levee slopes shall not be burned. When levee slopes are burned in either locally or Federally constructed levee projects, it is usually started by parties unknown.

Item 5. While our operation and maintenance manuals do permit grazing of the levee berms and slopes, it is discouraged. Experience has shown that overgrazing has destroyed the permanent grasses and weedy growth and brush soon develops. Due to previous problems encountered, most levee districts do not permit grazing under any conditions.

It is stated in reference letter a. that the recommended practices are being provided for consideration by the levee district commissioners. Their inclusion in the survey report will provide the opportunity for that consideration.

Sincerely yours,



MILTON MINDEL

Chief, Engineering Division



UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

GREAT LAKES REGION
33 EAST CONGRESS PARKWAY, ROOM 410
CHICAGO, ILLINOIS 60605

July 2, 1969

Col. Edwin R. Decker
District Engineer
U.S. Army Engineer District, St. Louis
906 Olive Street
St. Louis, Missouri 63101

Dear Colonel Decker:

The draft of the "Plan of Survey for Perry County Drainage and Levee Districts Nos. 1, 2 and 3, has been reviewed.

This project, which will provide internal drainage to the protected lands, has no significant water quality aspects and there is no need for FWPCA to participate in the planning of the project. We anticipate reviewing the completed report to advise the Secretary of the Interior in the review required under Executive Order 11288.

Thank you for keeping us informed of your water resource investigation activities.

Sincerely yours,

H. W. Poston
Regional Director



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

LAKE CENTRAL REGION
3853 RESEARCH PARK DRIVE
ANN ARBOR, MICHIGAN 48104

D 6427 (SL)

March 8, 1971

District Engineer
U. S. Army Engineer District,
St. Louis
210 North 12th Street
St. Louis, Missouri 63101

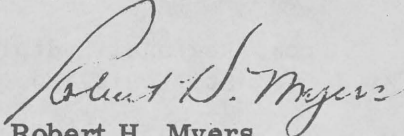
Dear Sir:

We have reviewed the draft Survey Report on Interior Flood Control Improvements for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, transmitted with your letter (LMS-ED-BG) of February 24, 1971. We have no comments to make on the proposed plan of improvements at the present time.

Sincerely yours,

ROMAN H. KOENINGS
Regional Director

By:


Robert H. Myers
Acting



UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 340
Rolla, Missouri 65401

September 8, 1969

District Engineer
U.S. Army Engineer District, St. Louis
906 Olive Street
St. Louis, Missouri 63101

Attention: A. J. Tiefenbrun, Asst. Chief, Engineering
Division for Planning

Dear Sir:

We have reviewed the Plan of Survey for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri, and have no comments or suggestions concerning the proposed study.

Sincerely,

Anthony Homyk
District Chief

cc: Regional Hydrologist, MCR, WRD
St. Louis, Mo.



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

BARTLESVILLE OFFICE OF
MINERAL RESOURCES

ROOM 204 FEDERAL BUILDING
BARTLESVILLE, OKLAHOMA 74003

August 7, 1969

A. J. Tiefenbrun, Assistant Chief
Engineering Division for Planning
Department of the Army
St. Louis District, Corps of Engineers
906 Olive Street
St. Louis, Missouri 63101

Refer to: LMSD-BF

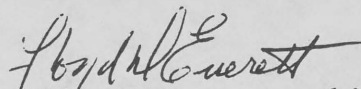
Dear Mr. Tiefenbrun:

Your request of June 26, 1969, for a review of the Plan of Survey, Perry County Drainage and Levee District No.'s 1, 2, and 3, Missouri and Illinois, was referred to us by the Twin Cities Office of Mineral Resources. The Bartlesville Office of Mineral Resources is not funded to participate in the described study but is concerned with reviewing any resulting report and plans to determine their possible involvement with mineral resources and installations in the Missouri part of the described area.

Our office records of the mineral industry reveal that limestone from an unspecified locality is currently the only mineral commodity produced in Perry County. Limestone was formerly quarried near Menfro, adjacent to the study area. Resources of silica sand and inactive lead, zinc, and iron mines or prospects are elsewhere in the County. A 20-inch oil pipeline of Magnolia Pipeline Co. crosses the northern part of the study area. The amount and value of limestone produced annually are significant but cannot be revealed, as they are company confidential information. We understand that the Plan of Survey would not relate to mineral industry in Illinois.

Any mineral resources or facilities, including the oil pipeline, that are within the study area warrant examination by qualified personnel to determine their relationship to construction that may be recommended under the proposed survey. Implied or stated provisions for such examination would make the Plan of Survey acceptable to the Bartlesville Office of Mineral Resources.

Sincerely yours,


Floyd D. Everett, Chief
Bartlesville Office of
Mineral Resources



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

LMSD-B

24 February 1971

Mr. Floyd D. Everett
Chief, Bartlesville Office of Mineral Resources
U. S. Bureau of Mines
Room 204, Federal Building
Bartlesville, Oklahoma 74003

Dear Mr. Everett:

Inclosed is a draft copy of the Survey Report on Interior Flood Control Improvements for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri. Any comments you may care to make on the proposed plan of improvements would be appreciated.

This office obtained maps and profiles of the Magnolia pipeline across the districts from the Mobil Pipe Line Company, Dallas, Texas. The location of the pipeline is shown on Plate 1 of the survey report. Assurance that there will be no conflict between the pipeline and the proposed shallow "V" ditch between Claryville and Missouri Chute, will be established during preconstruction design stage after the project is authorized and funded.

Receipt of your reply by 26 March 1971 would assist us in maintaining our schedule.

Sincerely yours,

A handwritten signature in cursive script, reading "A. J. Tiffenbrun", is positioned above the typed name.

A. J. TIEFFENBRUN
Asst. Chief, Engineering Division
for Planning

1 Incl
As stated



UNITED STATES
DEPARTMENT OF THE INTERIOR
SOUTHWESTERN POWER ADMINISTRATION

POST OFFICE DRAWER 1619
TULSA, OKLAHOMA 74101

IN REPLY REFER TO:

SPA-RH

July 18, 1969

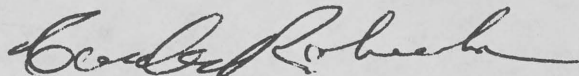
Your reference:
LMSED-BF

District Engineer
U. S. Army Engineer District,
St. Louis
906 Olive Street
St. Louis, Missouri 63101

Dear Sir:

Thank you for the letter of June 26, 1969, concerning the Detailed Plan of Survey for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri and Illinois. Any improvements which might be proposed for the area will not affect our interests, and consequently we have no comments and will not participate in the study.

Sincerely yours,


Carl E. Roberts
Assistant Administrator
for Planning and Resources



UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
NORTHEAST REGION

143 SOUTH THIRD STREET
PHILADELPHIA, PA. 19106

IN REPLY REFER TO:

L7423

July 18, 1969

Mr. A. J. Tiefenbrun
Asst. Chief, Engineering Division
for Planning
St. Louis District
Corps of Engineers
906 Olive Street
St. Louis, Missouri 63101

Dear Mr. Tiefenbrun:

We appreciate the opportunity to review the Detailed Plan of Survey for Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri.

Members of our staff have examined this report and we find that this project would not presently be of interest to this Service. However, we would appreciate being kept informed of any new developments in this area.

Sincerely yours,

Robert N. Perkins, Jr.
Acting Chief, Federal and State Assistance

THE STATE



OF MISSOURI

Water Resources Board

CLIFFORD L. SUMMERS
Executive Director

Department of Business and Administration
JEFFERSON CITY, MISSOURI 65101
May 3, 1971

P. O. Box 271
Area Code 314
Telephone 635-9251

Colonel Carroll N. LeTellier
District Engineer
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

Field review of your draft "Survey Report on Interior Flood Control Improvements, Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri," has been completed. The State position regarding this project is one of early implementation for those improvements recommended in your report.

The comments assembled from Missouri state agencies emphasized concern over the environmental affects of the project and have been transmitted separately in reply to your request for comments on the environmental impact statement.

To assure minimum effects resulting from improved efficiency on existing crop lands within the drainage district, we request that Corps of Engineer personnel working in the area emphasize the importance of retaining existing woodlands and marsh areas to benefit fish and wildlife. Landowners should be encouraged to contact the Missouri Department of Conservation for assistance and advice in retaining and enhancing wildlife habitat within the districts.

Sincerely,

A handwritten signature in cursive script that reads "Clifford L. Summers".

Clifford L. Summers
Executive Director

CLS:rjk

MISSOURI DEPARTMENT OF CONSERVATION

North Ten Mile Drive - Jefferson City, Missouri 65101

P. O. Box 180 - Telephone 314-636-8141

Carl R. Noren, Director

July 19, 1968

Mr. Donald F. LaPointe
Acting Regional Supervisor
Division of River Basin Studies
Bureau of Sport Fisheries and Wildlife
1006 West Lake Street
Minneapolis, Minnesota 55408

Dear Mr. LaPointe:

The proposed draft letter report covering interior drainage improvement within Perry County Drainage and Levee Districts Nos. 1, 2, and 3, Missouri has been reviewed.

Based on a study of the file and a field inspection of the area, the recommendations and conclusions closely parallel our thinking. Recommendation number four pertaining to burning might be reworded slightly to be less positive about discontinuing burning. From a wildlife standpoint, the most desirable conditions would exist from the initial stage, when vegetation is knocked back, through a period of some three or four years of natural succession. At that stage, considering that the aim of the district will be to keep the levee in a non-woody cover, from a wildlife standpoint, a burn might be feasible to again set back succession.

We appreciate having this opportunity to comment on the proposed project report.

Sincerely,

/s/ Carl R. Noren

CARL R. NOREN
DIRECTOR

RICHARD B. OGILVIE
Governor



RAY C. DICKERSON
Director

STATE OF ILLINOIS

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

April 7, 1971

Colonel Carroll N. LeTellier
District Engineer
St. Louis District
Corps of Engineers
Department of the Army
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel LeTellier:

Reference is made to your letter of February 24, 1971, File LMSED-B, in which you requested comment on your Survey Report on Interior Flood Control Project Perry County Drainage and Levee Districts No.'s 1, 2, and 3, Missouri and Illinois.

The Illinois Natural Resource Development Board has reviewed the Report and has no adverse comment to make.

Sincerely,

A handwritten signature in cursive script that reads "Ray C. Dickerson".

Ray C. Dickerson

Attachment 1
INFORMATION CALLED FOR BY SENATE RESOLUTION 148,
85TH CONGRESS, ADOPTED 28 JANUARY 1958

1. Additional information on recommended and alternative projects, called for by Senate Resolution 148, 85th Congress, adopted 28 January 1958, is given herein.

2. Perry County Drainage and Levee Districts Nos. 1, 2, and 3, located on the right bank of the Mississippi River, contains a total of 26,881 flood plain acres. Levee District No. 1, the most upstream district, also receives runoff from about 30 acres of hill land adjacent to the flood plain. Runoff from about 71,500 additional acres of bluff and hill land formerly tributary to the districts has been diverted by a channel constructed along the base of the bluffs to the Mississippi River at the downstream end of the districts. Protection against direct flooding from the Mississippi River or by backwater up the diversion channel, together with diversion channel runoff from the hill land area, is provided by levees constructed under authority of the 1936 Flood Control Act. The levee system was completed in 1968. About 97 percent of the districts is in cultivation or in diverted acres in compliance with the Feed Grain Program and drainage of those lands is accomplished by systems of drainage ditches and gravity outlet structures. Approximately 93 percent of the districts is drained by four major drainage systems: Ditch A, Missouri Chute, Cinque Hommes Creek, and Jones Cutoff. The lowermost of the drainage outlets for these drainage systems become blocked when Mississippi River stages exceed 13 feet on the Chester, Illinois, gage, and substantial damages occur to crops and property when runoff from rainfall and seepage accumulates within the districts. The investigation shows that, had the present levee protection been in existence during the 57-year period, 1913 to 1969 inclusive, there would have been only four years in which no interior flood damages would have occurred. This blockage would normally have occurred during the cropping season with a maximum of 148 days and an average of 91 days per year. The maximum and average annual areas flooded by blocked drainage are estimated to be 12,251 and 5,849 acres, respectively.

3. All possible effective plans of alleviating interior flood damages were considered. Because the districts are essentially encircled by the levee system and because the completeness of the existing

drainage systems offers no significant opportunity for improvement by major diversion ditching, all plans involved pumping. Interior flooding can be substantially alleviated by the installation of one or more pumps which would be operated during periods when the gravity structures are closed because of high Mississippi River stages. The most feasible plan of improvement consists of four pumping stations and appurtenant facilities. The largest, a 130 cfs capacity pumping station, would provide relief to the 8,687 acres in the Cinque Hommes drainage system. Pumping stations of 115,100 and 60 cfs near the gravity drain outlets of the Jones Cutoff, Ditch A, and Missouri Chute areas would provide relief to the respective 3,855; 10,769; and 3,570 bottomland acres in their modified drainage systems.

4. Runoff from the Ditch A (called Bois Brule), Cinque Hommes and Jones Cutoff drainage area, constituting 87 percent of the districts' drainage areas all drain into the diversion channel. Under one alternative plan, consideration was given to construction of a barrier dam across the mouth of the diversion channel. Drainage from the three areas and from the 71,500 acres of hill land would discharge through a gated passage in the dam during low river stages and be pumped over the dam during high stages. An additional pumping station would be provided for the Missouri Chute area. This plan was discarded after cursory investigation because of the apparent higher cost of providing protection equivalent to that of other alternate plans. Four additional plans, consisting of one, two, three, and four pumping stations were analyzed. The recommended four-station plan was found to be the most economical principally because of the costs of the diversion ditching required in the other three plans. During the discussion of the alternative plans of improvement with local interests, they expressed a strong desire for the four-station plan stating that they had long considered this plan to be essential to an adequate solution of the flood problem.

5. With the proposed improvement facilities being recommended as a modification to the existing levee project which has a 100-year economic life, they likewise are considered to have a 100-year economic life. Benefits for project justification are based essentially upon projected agricultural development in the districts over the 100-year period subsequent to start of project operation. Sufficient analyses of future agricultural development through the year 2020 have been made by Federal agencies and others to provide a reasonable indication of what may be expected over that period of time. However, estimates of development to occur after that time are difficult to appraise due

to the questionable nature of technological advancements in crop production and the magnitude of changes in employment as well as the shift in the character of the economy. Since the project considered herein readily lends itself to staged construction, it is considered that the flood control needs of the districts can be best satisfied by initial construction of facilities capable of supplying the protection required in the first 50 years with subsequent additions to be made, if required, after that time.

	<u>Federal</u>	<u>Non-Federal</u>	<u>Total</u>
<u>First costs (July 1969)</u>			
50-year project life (50-year sized capacities)	\$2,670,000	\$ 28,000	\$2,698,000
100-year project life (100-year sized capacities)	2,773,000	28,000	2,801,000
100-year project life (50-year sized capacities)	2,670,000	28,000	2,698,000
<u>Operation & maintenance costs</u>			
50-year project life (50-year sized capacities)	0	83,000	83,000
100-year project life (100-year sized capacities)	0	85,500	85,500
100-year project life (50-year sized capacities)	0	83,000	83,000
<u>Major replacement first costs</u>			
50-year project life (50-year sized capacities)	0	0	0
100-year project life (100-year sized capacities)	0	257,500	257,500
100-year project life (50-year sized capacities)	0	\$1,951,000	1,951,000
<u>Annual charges</u>			
50-year project life (50-year sized capacities)	149,100	84,600	233,700
100-year project life (100-year sized capacities)	143,100	88,000	231,100
100-year project life (50-year sized capacities)	137,700	92,900	230,600

Average annual benefits

50-year project life (50-year sized capacities)	344,400
--	---------

100-year project life (100-year sized capacities)	363,000
--	---------

100-year project life (50-year sized capacities)	348,400
---	---------

Benefit-cost ratios

50-year project life (50-year sized capacities)	1.5
--	-----

100-year project life (100-year sized capacities)	1.6
--	-----

100-year project life (50-year sized capacities)	1.5
---	-----

6. As a result of the alternative studies as described in the preceding paragraphs 3 and 4, the four pumping station plan with initial installation consisting of pumping plants with capacities based upon the 50-year analysis was recommended for authorization. The alternative plans of improvement were discussed with local interests. They indicated their acceptance of the recommended plan, as well as their willingness and ability to furnish the necessary assurances of local cooperation. Federal and State agencies consider that the plan of improvement will not adversely affect their considerations in the area.



